

ALL YOU NEED TO KNOW ABOUT NETFLIX

SINGAPORE

MARCH 2016 // S\$6.90  
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THE POWER TO DECIDE

THINK

IT'S THE DIGITAL  
AGE, WHY ARE  
YOU STILL  
READING  
ON PAPER?

IS OLED  
FINALLY  
READY  
FOR  
PRIME  
TIME?



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GALAXY TAB S2 8.0**  
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**ASUS ROG GX700**  
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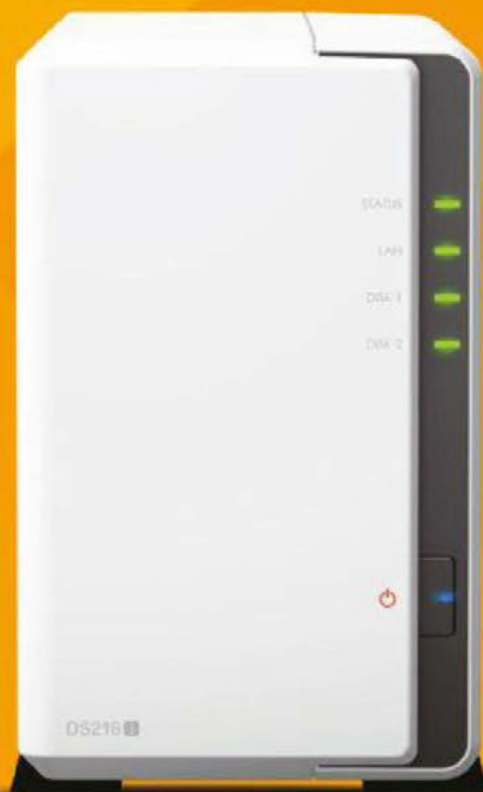
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Multimedia



Anywhere access



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### Available mobile Apps



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DS video



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DS file



DS note



**FUJIFILM**  
Value from Innovation

**X70**

## CAPTURE STORIES OF YOUR EVERYDAY LIFE

- 16.3 megapixels X-Trans CMOS II APS-C sensor
- First Touchscreen X-Series Camera
- 180 degree tilting LCD screen
- High Speed precision 6 Types AF modes
- 18.5mm F2.8 FUJINON single focal length lens

THE ULTIMATE **X** STREET  
COMPACT PHOTOGRAPHY

Photo taken by:



X-Photographers

Alk Beng Chia,  
using FUJIFILM X70



The X70 premium compact camera with a 28mm equivalent wide-angle lens (35mm format equivalent) is great for everyday use. Featuring a 180 degree tilting LCD screen and the first-ever touchscreen for X-series cameras, ideal for fast shooting at a wide variety of angles. Bringing high speed and precision for the ultimate shooting experience with the all new 16MP X-Trans sensor and EXR-II processor.



### Tilting LCD Screen

Shoot at any angle with the 180 degree tilting LCD Screen

A 3.0-inch 1.04M-dot 180 degree tilting LCD screen allows the user to shoot from a wide variety of angles and optimised for selfies. The X70's wide-angle lens is ideal for high-quality environments: portraits that include your surroundings too.



### Touchscreen

The first touchscreen on X-Series camera

The X70 is the first X-series model to feature touchscreen control. It allows the user to select a focus area and use Touch Shot to take a picture quickly. During playback, smartphone-style gestures can be used, offering an enhanced image-viewing experience.



### 18.5mm F2.8 Lens

Make the most of every situation

The X70 features a 18.5mm F2.8 wide-angle fix lens capable of covering everything from snapshots to landscapes. The newly developed technology of FUJINON lens allows user to shoot with precision and outstanding image quality.





## SOCIAL UNREST

Social networks can be either boon or bane, depending on who you have in your 'friends' list, but what many may not realize is how social networks have become the medium of choice for this generation's snake oil salesmen to peddle misinformation. As we become comfortable with technology, we tend to place our trust that said technology will do us no wrong. But there is a difference between trusting a fitness tracker to provide an accurate account of your 10,000 steps-a-day goal, and putting blind faith in everything read online.

This phenomenon is so common, it's a meme often joked about within tech circles, "If it's on the internet, it must be true."

The more alarming trend though, is a kind of mob mentality. People derive opinions about topics they would otherwise have no interest in or no knowledge of, because they read it online and

their friends have been sharing it. These opinions become so ingrained, the truth is often rejected even when presented with real facts.

A personal anecdote is the recent launch of Netflix in Singapore. Many people have asked for advice about getting onto the streaming bandwagon, but I know many more that have already sworn off the service because of its apparent vast gulf in content offering between Singapore and US versions—without ever having tried either.

If you're the go-to tech person in your family or social circle, you probably have similar experiences. It is my hope that our stories in HWM can be of some help to you in these situations, which would make our work all the more meaningful.

**Zachary Chan**  
EDITOR



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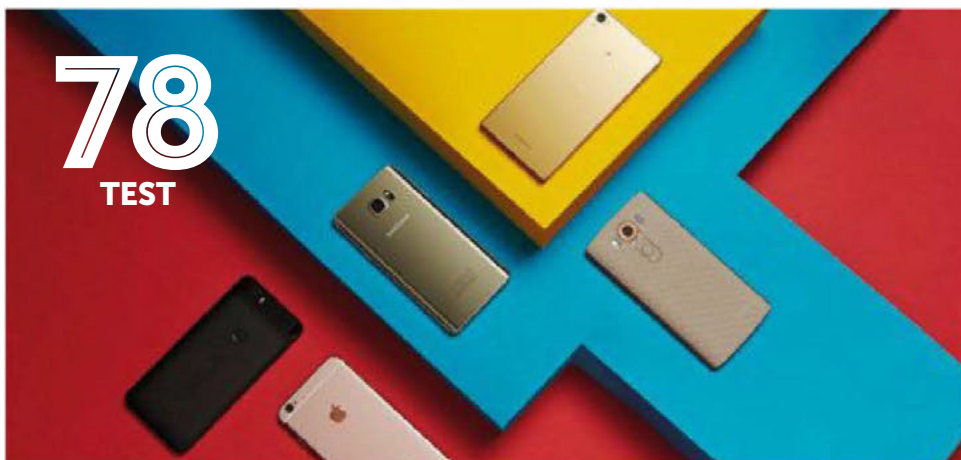
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## GEAR

# NEW THIS MONTH

Every month, we receive dozens of product announcements and mentions, sit through many a launch event and try out all kinds of devices. All these products are then carefully curated by our crack team of tech gurus. The final list is presented here in Gear and it is our hope you'll find something to geek-out to.

## MORE INSIDE >

### CASIO WSD-F10

The rugged smartwatch you can take anywhere, literally.

### LOGITECH G502 PROTEUS SPECTRUM

One of the coolest gaming mice gets a bling upgrade.

### KODAK SUPER 8

Escape the digital life with this throwback film camera.



## ZEISS OTUS EXOLENS

These lenses are a tie up between Zeiss (who provide the lenses) and Fellowes (for the Exolens mount). Three different lens versions are on offer; a wide-angle, macro and telephoto lens. The wide-angle and telephoto lenses use Zeiss' Mutar design, while the macro lens comes with a continuous zoom.







## HUAWEI MEDIAPAD M2 10.0

Huawei's MediaPad M2 10.0 is an alternative to Apple's iPad. Featuring a 10.1-inch IPS display with a 1,920 x 1,200 resolution, the 7.35 thick device comes in multiple variants with up to 3GB RAM and 64GB storage. It is powered by a Hisilicon 930 processor, Mali-T628 MP4 GPU, a 6,600mAh battery and Android Lollipop 5.1.



## PIONEER SE-MASTER 1

With each set costing US\$2,500, the headphones are undeniably aimed at those who love quality. The headphones have an aluminium frame with a ceramic coating and the drivers can deliver high def audio from 5Hz to 85,000Hz with its two 50mm drivers and is meant to be paired with high resolution music formats like MQA.





## KLIPSCH R6 IN-EAR BLUETOOTH

Like the R6 series sound but prefer the convenience of wireless? Klipsch has you covered with the new R6 In-ear Bluetooth. They weigh a mere 23.5g, but still deliver quality sound using 6.5mm KG-065 Dynamic Moving Coil Micro Speaker drivers with a frequency response of 10Hz to 19kHz. It comes with an 8 hour battery life.



## CASIO WSD-F10

This US\$500 Android Wear watch is Casio's first foray into smartwatches. Built like a G-Shock with military standard ruggedness (MIL-STD-810G) and 50m water resistance, it has dedicated outdoor features such as a compass, barometer, altimeter and tide graph. Its dual-display design features both a color and monochrome LCD on different layers. You turn off smart functions, leaving the monochrome LCD acting as a standard digital watch for extended battery life.





## ROCCAT RENGA

Roccat's Renga headset is great if you're on a budget and need a headset that can be used on mobile devices, PC and consoles. Featuring 50mm neodymium drivers in each cup, the headset aims to deliver quality audio without compromising on comfort.

That's why it has a lightweight skeletal frame, ventilated and padded ear cups, along with an ergonomic headband. It even comes with an remote that allows you to access your most used sound settings.



## SONY GTK-XB7

With Sony's unique EXTRA BASS technology, you can literally feel the deep bass notes in your music when you use this single floor-standing speaker. The GTK-XB7 also boasts two 16cm woofers, three 5cm cone-type tweeters, and 12 flashy lighting modes via its integrated multi-colored LED lights - making it the main culprit for a rave party. If you like karaoke instead, it's also equipped with two mic inputs, besides the now-expected wireless Bluetooth and wired AV input.





## LOGITECH G502 PROTEUS SPECTRUM

The Proteus Spectrum is an upgraded version of the hugely popular G502 Proteus Core. It retains all the features that made the original so good, namely, the 12,000 DPI optical sensor, removable weights and 11 programmable buttons for quick access to crucial in-game functions. What's new is customizable RGB lighting for gamers who want their mouse to match their rig.



## INTEL COMPUTE STICK (2016)

The Compute Stick just got a much needed upgrade with sixth-generation Intel Core M processors, configurable up to the Core M5-6Y57, with 4GB DDR3 RAM and 64GB eMMC storage. Networking capabilities also get a boost with a 2x2 dual-band wireless module. This could finally be the stick PC that turns your TV into a computer that you can use without tearing your hair out.





## LENOVO THINKPAD X1 TABLET

Lenovo's new Thinkpad X1 Tablet is more than a 2-in-1 hybrid. This 12-inch tablet's main claim to fame is its versatile design. It features multiple base modules that can enhance the tablet with additional functionality. Want more battery life, a projector or a 3D camera? You got it.



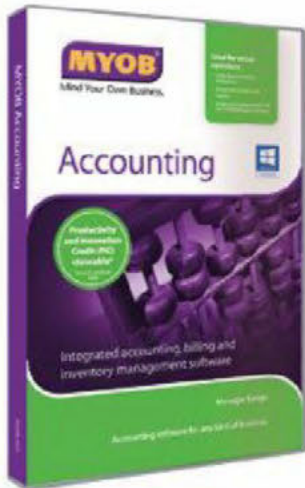
## KODAK SUPER 8

Kodak brings back film with this Super 8 camera. It accepts new film cartridges made specially for the camera, each with a shooting time of about 2 and a half minutes. Once you're done, you ship off the cartridges to Kodak for processing and scanning and then they'll send you back your recording. The camera itself features manual aperture and focus control, but skimps on other modern camera perks though we figure those who buy the camera won't mind that one bit.



# ACCOUNTING DOESN'T HAVE TO BE HARD

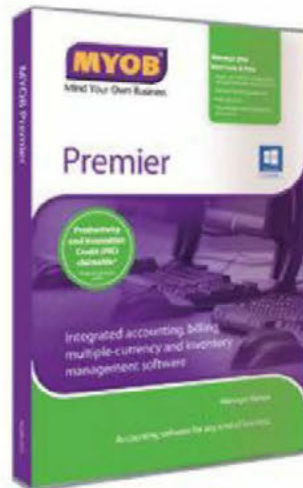
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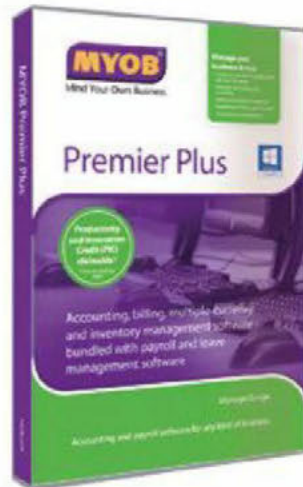
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The ZEISS Otus family of lenses is crafted for outstanding images, with no compromise on quality.

Imagine a lens that lets you shoot wide open at  $f/1.4$ , with smooth bokeh, biting contrast and sharp details across the frame, with no fear of distortion, soft corners or chromatic aberration.

It sounds like a dream, but the Otus lenses from ZEISS have been specially crafted to do just that. The lenses provide the image quality and look of medium format systems for the modern DSLR camera with high-resolution sensors, even at the widest apertures.

The wide  $f/1.4$  apertures let you see more in low light, just like the owl

species the Otus lenses are named after. Shooting wide open also helps you draw the eye precisely to your focal point, with natural background blur isolating your subject.

The lenses aren't just optically precise, but are also mechanically robust, with all-metal construction, focus rings built for the finest adjustments, and a distinguishing silhouette with elegant curves.

The Otus lenses are the pinnacle of over 125 years of experience in optical and mechanical excellence. Experience the difference for yourself.



## ZEISS OTUS 1.4/28

The ZEISS Otus 28mm  $f/1.4$  lens offers wide-angle clarity for the landscape, architectural or street photographer. The lens captures high image contrast and detail all the way into the edges, and at all distances, without image artifacts. The lens consists of 16 elements in 13 groups; with a floating elements design.



## ZEISS OTUS 1.4/55

The ZEISS Otus 55mm  $f/1.4$  lens is a versatile lens, suitable for a wide variety of professional shoots, especially advertising, fashion, and studio photography. The lens captures outstanding sharpness and contrast, with no visible chromatic aberration. The lens is crafted with a floating elements design, with 12 lens elements in ten groups.



## ZEISS OTUS 1.4/85

The ZEISS Otus 85mm  $f/1.4$  has a classic short telephoto focal length that makes it perfect for photographing portraits, and is also an all-rounder for studio work, fashion, advertising, product or architectural photography. The lens consists of 11 lens elements in nine groups, with a floating elements design.

The moment when your expectations change forever.  
**This is the moment we work for.**



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Learn more about the lenses at  
[www.zeiss.com/otus](http://www.zeiss.com/otus)





### TINY SPEAKER, BIG SOUND

The US\$999.95 Mu-so QB speaker is 21cm cube that packs two 50W tweeters, two 50W mid-range speakers, a 100W subwoofer and a heatsink to cool it all. The speaker is compatible with Naim app, which allows multiple Naim systems to be linked together. Needless to say, the speaker is capable of playing High Definition audio as well.

**Naim Audio Mu-so QB**

### A QUICK PACE OUTDOORS

Designed for use during physical training, the Jabra Sport Pace is a wireless earbud with an ear-hook form factor for better grip during rigorous activity. It is built towards US military standards of rain, shock, sand and dust resistance (IP54). Not only does it provide a maximum five hours of music or talk-time, it also comes with a fast-charging function where a 15 minute charging period can give the user an hour's use with the device. **Jabra Sport Pace**



### BIG, FAST AND CURVY

What do you get when you combine a 160Hz refresh rate, a 35-inch screen, and a curved panel? The AOC C3583FQ as it turns out. The vertical alignment (VA) panel offers improved viewing angles so colors won't appear faded even at the monitor's extremities, and it supports AMD's FreeSync technology for a smoother gaming experience. The monitor's 2,560 x 1,080 pixel resolution isn't the sharpest out there, but we'd overlook it for its high refresh rate and size. **AOC C3583FQ**



### SMARTWATCH ON THE RIGHT TRACK

Lots of trackers are just wrist candy, while many smartwatches slap on trackers as an afterthought. The Fitbit Blaze is a full smartwatch with a proprietary operating system. You can field phonecalls and check notifications, and is a full-fledged fitness tracker complete with sleep and heart rate tracking. It's attractive enough for daily use too. **Fitbit Blaze**

## EXTEND YOUR VIEW

The 15.6-inch ASUS MB169C+ portable monitor features a single USB Type-C port that is used for both video and power transmission. Its full HD IPS panel has a resolution of 1,920 x 1,080 pixels and weighs just 800g. The new portable display should work well with any system with a USB Type-C connector and promises to extend your viewing experience with a single cable.

**ASUS MB169C+**

## THE WORLD'S LARGEST SSD

Would you like a 13TB SSD? Of course you would, everybody would! Great news on that front, if you have the cash you can get one in that capacity right now. The Fixstars 13TB SSD offers a 540MB/s read speed and 520MB/s write speed. It also has temperature controls to minimize heat damage and an optional high durability mode, which halves the capacity (to 6.5TB) but offers triple the lifespan of the SSD. Did we mention it costs around US\$13,000? **Fixstars SSD-13000M**



## MUSIC ON THE GO

If you're a fan of chiptunes, you'll love the PO-20 Arcade, a pocket synthesizer you can use to create 80s sounding music on the go. Meant for both newcomers and advanced users, the PO-20 Arcade is loaded with sounds reminiscent of old school arcades. The synthesizer has lead, bass and rhythm components so you can create a fully fleshed out piece with just this single device.

**Teenage Engineering PO-20 Arcade**

## AMPLIFIED RESONANCE

The Sony SRS-XB3 portable speaker comes with a 48mm full range speaker unit and two passive radiators. These splash resistant speakers (IPX5) supports NFC pairing and daisy-chaining via the Speaker Add function, which in turns comes in either Double mode (where both speakers will play the full tracks back together) or Stereo mode (where the speakers will also play but in left-right stereo).

**Sony SRS-XB3**

### SONGS OF THE SEA

The Sony WALKMAN WS413 and WS414 have 4/8GB storage and it comes with in-built earpieces, making it a complete audio wearable that's worn around the back of your head. What makes it stand out is its IP65/IP68 high-level weatherproofing, which makes the sealed wearable salt-waterproof. It works in places with temperatures within 5°C to 45°C, making it highly resistant to the elements, especially in water. **Sony WALKMAN WS410 Series**



### PROBABLY BETTER THAN OCULUS

HTC is pulling out all the stops for an upgraded Vive VR. The Vive Pre features quality-of-life upgrades like nose gaskets and foam inserts for comfort, a front-facing camera to see your surroundings without removing the headset and haptic feedback controllers for better immersion. SteamVR tools support offers greater optimization with Steam games too. **HTC Vive Pre**



### ALL STEALTH AND STYLE

The MSI X99A Godlike Gaming Carbon is a special edition of the top-end X99 board of the same name announced last year. Clad in black and carbon fiber detailing from head to toe, the board features metal-reinforced PCIe slots, Killer DoubleShot-X3 Pro network management technology and MSI's Mystic Light RGB LEDs. With the ability to choose from 16.8 million colors and 16 LED effects, you'll literally be spoilt for choice. **MSI X99A Godlike Gaming Carbon**



### MINIMALISTIC FLAIR

Many gaming keyboards are chunky affairs with full-sized wrist rests and rows of macro keys that take up way too much space. The Cooler Master MasterKeys Pro L is something different, combining a sleek, minimalist design with full RGB backlighting. Multiple lighting presets are included like breathing and color wave. It is available in Red, Brown, or Blue Cherry MX switches. **Cooler Master MasterKeys Pro L**



### XTREME GAMING MOUSE

The XM300 is Gigabyte's first mouse from their Xtreme Gaming line and for a first effort it sure impresses. It features on-the-fly DPI switching with a 6,400DPI sensor, the ability to customize its colors, create macros and rebind its keys, plus ultra sensitive Omron switches. **Gigabyte XM300**

### WORKING THINGS OUT

The Jabra Halo Fusion is made for the executive who's constantly on-the-move. This wrap-around headset is a wireless unit with music and call support in one device. Despite how it looks, it weighs a mere 21g and comes with a one-tap switch button for the user to flit between music and phone calls seamlessly. It has a 6.5-hour battery life and it can be paired with two Bluetooth devices simultaneously - ideal for people switching between tablet and smartphone. **Jabra Halo Fusion**



### WORLD'S THINNEST CONVERTIBLE

The new Lenovo Yoga 900S is a smaller version of the Yoga 900 2-in-1 ultrabook. Its 12.5-inch IPS display boasts a resolution of 2,560 x 1,440 pixels, and it retains its bigger brother's distinctive 360° watchband hinge. At 12.8mm thick and weighing in at just under a kilogram, this is a convertible you can chuck into your bag and forget about. Oh, and you can get it in a lovely gold color.

**Lenovo Yoga 900S**

### GREEN WITH ENVY

Here's a desktop to match your Razer gaming peripherals. The Lenovo ideacentre Y900 Razer Edition features an overclockable sixth-generation Intel Core i7 K-series processor, up to dual NVIDIA GeForce GTX 970 cards in SLI, and 32GB of DDR4 RAM. The logo, front panel, and rear exhaust fan have all been tricked out with Razer's Chroma multi-colored LEDs, so you can sync the lighting effects with your other Razer gear. **Lenovo ideacentre Y900 Razer Edition**

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THINK

# PAPER AND DIGITAL DIVIDE

It has never been easier to read, write, draw and create digitally. So why are we still stuck on books?

Text by *Liu Hongzuo*

Photography by *Zaphs Zhang*

Art Direction by *Ken Koh*

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### IS IT FINALLY OLED'S TIME?

OLED is clearly the superior display, so why has it taken so long to go mainstream?

### 6 SHOWS TO WATCH ON NETFLIX

Netflix and chill with our TV selection.



# IT'S THE DIGITAL AGE, WHY ARE WE STILL STUCK ON PAPER?

Despite the proliferation of digital styluses and content, print still survives, dashing declarations of its inevitable doom. Why is the world still in a limbo between paper and digital?

by Liu Hongzuo



It has never been easier to work digitally. For artists making digital artwork, there's the Wacom Intuos Creative Stylus 2, and the Wacom Bamboo Smart stylus. There's also the Apple Pencil, which, you let's you do far more than writing or drawing, but only when used with an iPad Pro.

If you look beyond the stylus, there are the Microsoft Surface Pro 4 and Samsung Galaxy Note 5; both highly popular hybrids that incorporate a stylus. Indeed, print is dying, but that's because it's so much easier to work off a word processor, to chase people with emails over post mail, and read sensational drivel on a rumor site instead of a gossip magazine.

So with businesses, artists and your typical white-collar worker with a stylus-enabled smartphone moving their written work onto the digital platform, why do we still fall back on physical books when it comes to reading?

Our own HWM folks have polarizing opinions on the matter. Some claim that e-books are superior; given how much physical space and money they save, while the supporters of paperbacks argue that nothing beats the smell of opening a good book.

On the surface, it sounds like a terrible, emotional argument for books to stay, marred further by their environmentally destructive origins. But what if there's actually more to physical books that we didn't notice?

## Reading a physical book makes a map in your mind

The Scientific American claims that paperbacks have the advantage over digital formats. Paper books are superior in terms of feel and

flow, thanks to their physical form. Reading is defined by the left and right pages, framed by corners which help readers orient themselves and focus without losing track of progress.

Each physical page you turn creates a visible trail of progress, compounded by the relative thickness of pages read in your left hand, and the pages remaining nested in your right. Every page flip also creates a sense of rhythm.

All this is further amplified with how our human brains perceive reading – the academic International Journal of Human-Computer Studies noted that text is mentally represented by meanings tied to structure, just like how we read terrain on maps.

Behavioral studies also argue that people recall written information by remembering the location of where the text appeared. Anecdotally speaking, I had no trouble remembering how George Orwell's 1984 had a distinct pattern to it – with the third quarter of the book going knee-deep into political ideology after the protagonist meets his contact at a bar.

## Paper versus Digital

But isn't digital text far more intuitive, with the ability to search for key phrases at a whim? It's certainly more convenient, but digitized books rob the reader from getting the experience to mentally picture their reading progress.

And these implemented features still can't take away the greatest bane there is to the web-reading experience – scrolling. From Wired's research piece on paper versus digital, psychologist

**"The International Journal of Human-Computer Studies noted that text is mentally represented by meanings tied to structure, just like how we read terrain on maps."**

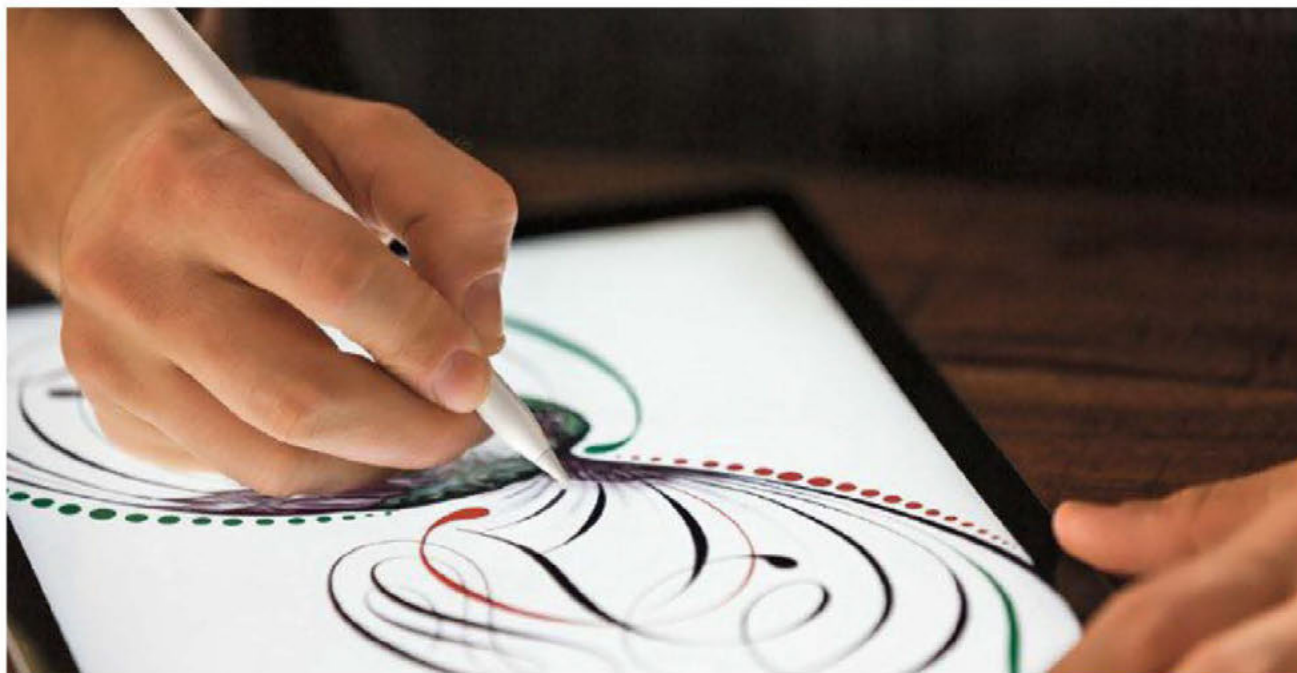
Erik Wästlund at Sweden's Karlstad University pointed out that scrolling through digital text created more distraction, compared to flipping a page.

The need to search for a new focus point after each swipe also distracted a reader from their text, and the psychologist said that the mental resources spent on scrolling could have been spent on understanding the text instead.

Even with these features, books dominate because of their

innate ability to track progress by thickness instead of page number. That alone is enough to tell us how subconsciously powerful a physical book is to a reader, even with the convenience of free literature compressed onto an easily accessible hard drive.

While it's easier than ever to capture your thoughts digitally, it seems physical books still provide the better reading experience. That helps to explain why tablets and screens still haven't replaced the good old paper book.



## THE BEST PAPER REPLACEMENTS YOU CAN GET

### 1. Phree stylus - US\$198

This stylus is one of the few that openly boasts compatibility across multiple platforms: Android and iOS, Windows and OSX, as well as programs such as Evernote and Photoshop. It also has the ability to track your writing on any surface – including your own skin.

### 2. Wacom Intuos Creative Stylus 2 - \$109

Designed for artists who work with iPads, this Bluetooth-connected stylus has 2,048 pressure levels and a durable stylus tip for extended use.

### 3. Microsoft Surface Pro 4 - From \$1,399

This hybrid is everything in a neat little package. Getting the Surface Pro 4 isn't just for the Surface Pen stylus, with its 1,024 pressure levels and magnetic attachment. What you're really paying for is the full Windows 10 operating system and the hardware that supports it. Because of its configuration, it's easy to jump in and out of digital work without much effort.

### 4. Samsung Galaxy Note 5 (32GB) - \$1,088

It's hard to avoid bringing up this Samsung phablet when you want to talk about wonderful stylus experiences on a device. The Samsung Galaxy Note 5's S Pen is much more than a writing instrument – it functions as a third limb for people who like precision and pen-holding while on their smartphone. Use the S Pen to scroll through webpages, access shortcuts, and many more – all from the convenience of your palm.

### 5. Amazon Kindle Voyage - US\$199

The Kindle devices by Amazon are regarded as the de-facto e-reader of choice, given their HD e-ink screen, automatic backlight, and intuitive handling. The latest iteration, the Kindle Voyage, comes with 4GB onboard storage and physical page-turning buttons called PagePress.

### 6. Kobo Glo HD - US\$129.99

If you want something as powerful as an Amazon e-reader with epub file format compatibility and no advertising, try this instead. The Kobo Glo HD also comes with 4GB internal storage and the same Carta E Ink display at 300ppi. The makers claim that it has a two-month long battery life if you read 30 minutes a day, which is significantly more than what the Voyage offers on a single charge.



# THE CAMERA IS DYING, BUT PHOTOGRAPHY HAS NEVER BEEN MORE ALIVE

The end of the compact camera is near, but another kind of 'compact camera' is taking its place.

by Marcus Wong



According to the latest report by the Camera & Imaging Products Association (CIPA), total shipments of cameras and related goods declined 18.5% year on year in 2015 to 35.4 million units. 2015 continues the downward trend that has hit the industry since the global recession of 2009.

However, compared to the 30.9% contraction in shipments for 2014, the

**"Compared to the 30.9% contraction in shipments for 2014, the decline in 2015 was substantially less."**

decline in 2015 was substantially less. This comes largely off the back of stable demand for interchangeable lens cameras (ILCs) and their lenses, as they accounted for 37% of total shipments.

Shipment of digital cameras with built-in lenses (i.e. compact cameras) on the other hand, showed a decline of 24.5% year on year to 22.3 million units. That's less than 80% of what they were in 2014!



### Why compact cameras have fallen so far

The reasons for compact cameras' dramatic fall are twofold – one is due to the fact that prices of interchangeable lens cameras have fallen dramatically over the years, so it simply makes more sense to get an ILC over a compact camera. Today's ILCs are small enough and offer better performance than compacts, so why not pick one up if you're going for a new camera?

The second – and probably bigger – reason is that the cameras that in our smartphones are getting better and better. Advanced camera functions are becoming more and more commonplace. Some smartphones offer the option to save images in raw, while others offer in-camera filter effects, panorama capture modes, and even the ability to shoot 4K video.

### Social media is the new photo album

Mobile phones have two key advantages over compact cameras: they're always with you, and they allow you to instantly share whatever images you've taken with the largest audience available: the internet.

Posting on social media has become today's equivalent of printing photos to display. Social media options are endless, from Facebook to Tumblr to Instagram, much faster than waiting for prints develop, and for the most part, free as well. After all, the photo is already in your phone and the phone is already connected to the internet, so it's really a case of pressing a few buttons on the screen.

Some compact cameras have gained these functionalities too, but for most users, the quality they get from their smartphones is good enough, especially for online and messaging, so why carry yet another gadget?

### How compact cameras might weather the storm

It's a confluence of forces that spell dread tidings for the compact camera. Already companies like GoPro are scaling down,

**“Despite the falling numbers of camera shipments through the years, the number of photographs taken and shared online has skyrocketed.”**

thanks to the rough financial times we're going through, and this should only become more prevalent through the industry.

The compact camera portfolio can only reasonably continue in three forms: The action/all-weather camera for conditions you wouldn't want to expose your smartphone to, the superzoom compact for people who want extended reach, and the premium compact which offers a larger sensor, for image quality that comes closer to ILCs.

### The most popular camera today is – guess who?

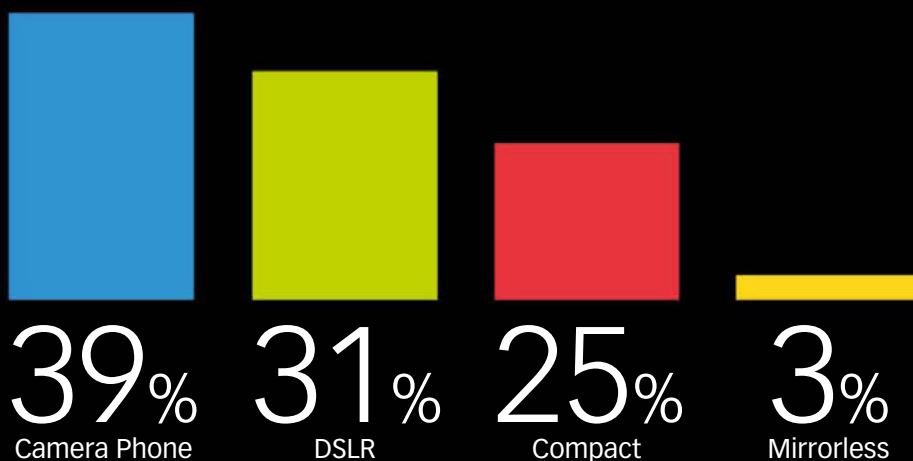
The numbers show this too. Despite the falling numbers of camera shipments through the years, the number of photographs taken and shared online has skyrocketed. InfoTrends' 2014 Worldwide Image Capture Forecast states that approximately 810 billion photos were taken worldwide in 2014. That number is set to grow to an astonishing 1 trillion photos in 2015. So where are all these images coming from?

The smartphone in everybody's hands. Flickr's Year in Review 2015 shows that 42% of their users used an iPhone to capture the images on their website, compared to just 27% by Canon EOS users and 16% with Nikon cameras. In fact, different versions of the iPhone take up 8 of the top 20 cameras that are used on Flickr.

It's obvious that the cameras in our smartphones are the cameras driving photography today. And that's certainly something camera makers should start taking note of. Rather than trying to create similar but bigger cameras, they should perhaps focus on helping their customers improve their skills, so they'll naturally look towards ILCs to take them further.

That, or take a leaf out of Carl Zeiss's book, and move into creating accessories like clip-on lenses for smartphones. Either way, it's clear to see that there are resources currently being devoted to compact cameras that could be better used in other ways.

## CAMERAS USED TO UPLOAD PHOTOGRAPHS ON FLICKR IN 2015



Data from Flickr Year in Review 2015.

# ARE OLED DISPLAYS FINALLY READY FOR PRIME TIME?

If what we have seen at CES 2016 is any indication, be prepared to see OLED displays coming soon to more devices near you.

by *Kenny Yeo*



**OLED** or organic light-emitting diode displays are not new. The first phones to use active-matrix OLED displays appeared as early as 2008, while the first commercially available OLED televisions made their way to store shelves about three years ago.

## How do OLED displays work?

OLED displays work by passing an electric current through a thin film of organic material to create red, blue and green lights - the basic colors needed to create a TV image. On the other hand, LCDs have pixels that are switched on or off using liquid crystals to rotate polarized light; while the now abandoned plasma technology ignites pockets of gas to excite phosphors.

This method of creating images gives OLED displays numerous advantages over traditional LCD displays. Since OLED displays do not rely on backlights, they can show true, absolute blacks; consequently, brightness uniformity across the entire display is also less of an issue.

OLED displays also enjoy wider viewing angles, higher refresh rates, contrast ratios and have a wider color gamut, which

explains why images on OLED displays look so vivid and photorealistic. The icing on the cake is that because there's no need for backlights, OLED televisions can be built thinner than LCD televisions. The thinnest OLED televisions are now thinner than smartphones.

**"Like any other new technology, there're teething issues that need to be addressed."**

## Why hasn't the superior OLED display become mainstream already?

With so many significant advantages over LCD displays, why then hasn't OLEDs become the mainstream display?

Like any other new technology, there're teething issues that need to be addressed. For a time, the limited lifespan of the organic materials used to create OLED displays was

the biggest problem.

Early OLEDs would lose their brightness after just 1,000 hours and would only achieve half their original brightness after 14,000 hours. This compares poorly to LCD displays, which would typically lose half their original brightness only after 25,000 to 40,000 hours of use. OLED displays are also prone to burn-in images. Like plasma displays, OLEDs can retain images temporarily or even permanently if left static for too long.

## OLED displays might finally be ready for prime time

Fortunately, these issues have largely been solved. According to LG, the biggest proponent of OLED displays, its OLED displays now have a lifespan of around 30,000 hours before brightness deteriorates - that equals to 10 years of watching television for 8 hours a day. Additionally, OLED television manufacturers have also implemented various anti burn-in features into their OLED televisions to prevent burn-in images from occurring.

In fact, thanks to advances in OLED technology, OLED displays might finally be ready for prime time. At CES 2016 we saw,



## THE FLAG-BEARER OF OLED TVS: LG G6

LG has been OLED's most visible proponent, and earlier this year at CES 2016, it unveiled its new G6 OLED televisions. Supporting 4K resolution and available in 77 and 65-inch sizes, the display of these new televisions is just 2.57 mm thick. The bezels are also just as thin. In fact, it's so thin that LG is calling the G6 televisions Picture-On-Glass.

To complete the futuristic look, the back of the television is translucent, and the televisions have forward-facing soundbar speakers. These new televisions run webOS 3.0, and also support OLED HDR and HDR formats such as HDR10 and DolbyVision.



for the first time, OLED displays being used in notebooks and computer monitors. Lenovo is offering optional OLED displays on their new ThinkPad X1 Yoga device. We saw the OLED variant alongside the standard IPS LCD model and the difference was astounding. The OLED model looked incredibly vivid and images were more lifelike.

Apart from Lenovo, Dell also announced its new 4K OLED UltraSharp 30 monitor at CES 2016. This new monitor boasts very impressive specifications including a 0.1ms response time and a 400,000:1 dynamic contrast ratio. It also covers 100% of the Adobe RGB color space, as well as 97.8% of DCI-P3 color space - the color space used extensively in cinema today. Although it's a monitor targeted at professional users, the insane response time and amazing colors would likely appeal to any enthusiast or power user as well.

**But there's still one problem to overcome** However, there's still one stumbling block and that's price - the Dell 4K OLED UltraSharp 30 monitor is expected to cost around US\$4,999 (\$7,137 at the time

of writing). Dell's existing UltraSharp 32 Ultra HD 4K monitor, which uses an IPS LCD display and was also designed for professional use, is considerably more accessible at US\$1,799 - just over a third of the price of the new OLED UltraSharp 30 monitor.

**"Price remains to be the biggest stumbling block that's preventing the widespread adoption of OLED displays."**

In fact, price remains to be the biggest stumbling block that's preventing the widespread adoption of OLED displays. If we were to compare similar-sized televisions using OLED and LCD displays, the OLED model will cost about 40% more. And according to IHS Research, it is estimated that it would cost manufacturers double to

put an OLED display into a PC as opposed to an LCD display.

New technology is always costly to manufacture partly because of immature manufacturing processes and also high R&D costs. This was the case for SSDs too, but look at how affordable they are now. Thankfully, prices of OLED displays could come down in the next year or so. The technology is fairly mature now and volume manufacturing by key players in the industry looks set to take place in the near future.

LG has just invested US\$380 million to build a new factory to ramp up production of OLED displays, which should help bring down the costs of OLED panels in time. Before LG's investment, Samsung announced an even larger US\$3.6 billion investment in February last year to build more OLED panels. Japan Display, another large producer of LCD panels, also announced that it would start mass production of OLED displays in 2018.

It seems that whatever hesitations manufacturers had about OLED technology have been allayed, and it's likely that OLED could be the predominant display technology in the not so distant future.



# REACTIONS TO THE ORIGINAL IPAD FROM SIX YEARS AGO

Was it really that bad?

by James Lu



The Apple iPad was announced exactly six years ago. Since then, it's evolved into the iPad Air, and a Mini version and a larger Pro version have come along too. But what was the reaction like when Steve Jobs first announced it?

Here're some selections from the Macrumors thread discussing the announcement (don't forget, Macrumors is an Apple fan site):

"This is a giant iPhone, there's no other way to put it. You can love it, you can hate it but in the end it is a giant iPhone. Not revolutionary at all."

"Bigger fail than Macbook Air and Apple TV combined ... all those years of waiting and all the hype ..."

"The keynote could have been 5 minutes long. 'Hey we took the iPhone and made it bigger, booya!' I can't believe this is it."

It wasn't all bad though, as one user put it: "WELCOME TO THE FUTURE,

PEOPLE! Homerun." We also loved this guy's response: "I can't wait till they make a pocket version of it ..."

## What about the press?

Engadget wrote, "What it was, however, was fairly underwhelming. Maybe underwhelming isn't the right word. Unimaginative might be more accurate."

Business Insider ran an article headlined, "The Truth about Apple's iPad: It's a Big Yawn."

David Pogue from the New York Times was one of the few optimistic ones, "That [criticism] will last until the iPad actually goes on sale in April. Then, if history is any guide, Phase 3 will begin: positive reviews, people lining up to buy the thing, and the mysterious disappearance of the basher-bloggers."

What did we think of the original iPad? We called it, "Sheer tablet brilliance." In fact, we dedicated eight (!) pages to it in our review on *HardwareZone.com*.

**"The Truth about Apple's iPad: It's a Big Yawn."**

## THE WORLD'S OLDEST TORRENT

by Marcus Wong



The nature of BitTorrent is that files only live on in the network if at least one person keeps seeding it. Which means, most torrents die after the public loses interest. So imagine how rare it is to find a torrent that's still going strong some 12 plus years after its creation on 20 December, 2003.

Created as a piece of fan-art, The Matrix-ASCII is the work of a single fan who painstakingly converted the movie frame by frame to ASCII text, then cropping, resizing and coloring the final output.

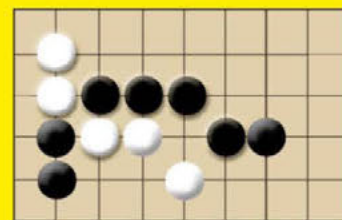
## GOOGLE'S AI WILL CHALLENGE THE BEST GO PLAYER IN THE WORLD

by Liu Hongzuo

After defeating European Go champion Fan Hui in a closed-door showdown last October, Google's AlphaGo artificial intelligence will be taking on Lee Sedol, the top Go player of the world of the past decade. This is the first time a computer program has ever beaten a professional Go player.

Designing an AI that can defeat professional Go players is more complex than creating AI for checkers or chess. These other games utilize traditional AI methods, while Google used a different approach to create AlphaGo – an advanced search tree infused with deep neural networks.

Google trained the AI's neural networks with 30 million possible moves from games played by human experts. The AI is capable of machine learning – it went on to play thousands of games within its own neural networks, then adjusted its connections by trial-and-error to determine the best rewards for its actions.



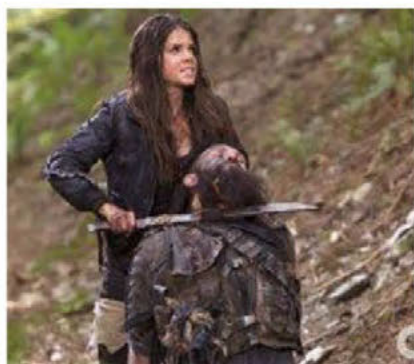
# 6 SHOWS TO WATCH ON YOUR LOCAL NETFLIX

Here are six shows we've picked out that may tickle your fancy.

by Koh Wanzi

## The 100

The 100 is set in a post-apocalyptic world, where what's left of humanity now lives in a revolving space station called the Ark. Eventually, 100 teenagers – all 'criminals' who have been spared the airlock fate because they are not yet 18 – are sent to the ground to test if the earth has become inhabitable again. That sparks off a daring concoction of non-stop action, heart-wrenching betrayals, and thought-provoking questions about how far one should go to survive.



## Brooklyn Nine-Nine

If you think The Big Bang Theory is getting a bit stale, you may want to check out Brooklyn Nine-Nine to get your daily fix of laughter. Set in the fictional 99th precinct of the New York Police Department, the show is a charming take on the standard cop show. Its cast of colorful characters shares a repertoire of sharply written lines, acerbic wit, and scenes that play on age-old police tropes for fresh entertainment value.



## Black Mirror

As a work of speculative fiction, Black Mirror is unnervingly relevant to our times, a sharp examination of the dark places that new technologies could lead us to. All the recent clamor over green technologies? One Black Mirror episode is set in a world where everyone must cycle on exercise bikes to generate electricity. Each episode stands on its own, but they're all incisive commentaries on the technologies and debates that dominate public discourse today.



## Jane the Virgin

Jane the Virgin is a side-splitting mix of drama, romance, and all manner of intrigue involving drug cartels, bodies buried in concrete and nefarious plots. For those of you who shun romantic comedies because you find them sappy, Jane the Virgin will make you rethink the genre. It's refreshingly self-aware, leveraging existing tropes and well-worn plot lines – love triangles and illicit affairs! – and turning them to its own ends. This is satire at its best and most unpretentious.



## Marvel's Jessica Jones

Basically, if you liked Daredevil, you'll like Jessica Jones. Done up in the same gritty, hard-boiled fashion, Jessica Jones tells the story of a superhero that is only too human, having to grapple daily with past traumas and the struggle of doing right by those she cares for. In a sense, it's a superhero show without all the gratuitous spandex, posturing and bicep flexing. But for those of you who watch superhero flicks purely for the action, there's plenty of that as well, and plenty of collateral damage along the way.



## Penny Dreadful

Fans of Gothic horror and literature will love this one. The show draws inspiration from the mainstays of 19th-century fiction, featuring an eclectic mix that includes Victor Frankenstein and his Creature, Bram Stoker's Dracula, and even Oscar Wilde's Dorian Gray. To cap that all off, the show also grapples with other supernatural elements like werewolves, witches, and demonic possessions, all tossed together in a titillating stew of Gothic horror and dark, foreboding sets.



# Does sound have no bounds?

NG CHEE SOON,  
PRESIDENT AND MANAGING DIRECTOR,  
SENNHEISER ELECTRONIC

by *Marcus Wong*

**First off, congratulations to Sennheiser for reaching its 70th Anniversary! That's a great achievement for any company, much less one that's family-owned and operated. What are some of the biggest things Sennheiser has learnt over the years?**

You know it's funny, because we were also just reflecting on how amazing it is to not just last for 70 years, but to thrive. I think one of those things was that we stayed a privately held, family business, and that has allowed us certain elements of sustainability built-in. A company like ours, because we're family-run and directed, we can often go beyond three-month directives.

For example, the Digital 9000 took 12 years in the making before we finally launched it. If we weren't a privately held company, I wonder if that wouldn't have been abandoned halfway through the development cycle!

I think the other thing is our passion for excellence. Our tagline: "In the pursuit of perfect sound" is wonderful, because "perfect sound" is a great vision to work towards. But you can never attain it; even with great products like the Orpheus. So, 24 years down the road, we came up with something else – the HE 1060/HEV 1060, with lots of improvement over what was considered the "Pinnacle of Sound". So there's that passion to move things along and to push the envelope.

A lot of times there's also temptation to go into other adjacent avenues, but we've stayed focused on our core competency – audio – and on creating products that don't sell out the philosophy. That takes a lot of discipline!

**Indeed. On that note, how do you see audio changing next?**

Well, the revival of vinyl suggests that it's not always about sound getting

finer, but also the experience. If you put vinyl next to High Res Audio (HRA), you could argue that vinyl is noisier and lower resolution, and yet there's a revival because there's that whole chain of the experience.

But, you can't reverse the trend of embedding more and more technology, and different companies are going to invest in putting more in to get maybe even more resolution out of music: more details, more everything.

However, all these trends ignore something extremely important – the source! In the end when you experience music, you need that translation from the audio source to an analog signal that the human ear can hear. Unfortunately nobody has made the human ear hear digital pulses directly yet, so we're still living in an analog world, and that's where we come in. And we believe that no matter what you do to the source, if you don't pay attention to how you listen to music, you'll miss half the equation.

**Ok. So what are the basic things you need to have a really good listening experience then?**

That can have many answers, depending on your application and personal preferences.

Of course, the basic thing is to have a good source. If you have MP3 at the lowest bit rate and the highest compression then you can't expect much. But, a good pair of headphones can still make the listening experience much better compared to the typical earbuds that come with your mobile phones.

Let's say you want to listen to nice music in a quiet, controlled environment. That's a different story altogether. You want to have preferably open headphones, because they tend to give you a wider soundstage and more natural reproduction. Also, you won't have to

worry about disturbing others so you can use large headphones with bigger diaphragms that have a better chance of less distortion.

Of course your music genres will also influence this so you will want to match your headphones to the type of music you listen to, because different headphones have different sound profiles.

**Here's a fun one to end with then. Speakers or headphones?**

Well, let me first say: different people have different preferences, and maybe I'm a little biased already. \*laughs\*

But first off, I think it's clear we like what we're used to. So people who grow up listening to speakers often find they go back to what they're used to. You could give them the best headphones in the world, but they'd still say they prefer speakers.

That said, I believe that if you're looking for the best reproduction of a recording you can't come close to the experience of headphones. Firstly, with speakers the sound interacts with your environment, so how good the sound is also depends on the acoustics of the room. Headphones cut that all out because the audio is projected directly into your ears.

Secondly, because the sound is sent through the air, it gets adulterated in certain ways. Because the diaphragm for headphones is so close to the ears, you get a lot less disturbance before it enters your ear drums.

Thirdly, in order for us to perceive sound from speakers, you need a lot more vibration from the diaphragms, so therefore a lot more movement, which means a higher chance of inaccuracy or distortion.

That's very measurable, so I'm convinced headphones give you the highest chance of the closest reproduction of sound, but of course there's nothing like watching a performance live. You can't ever replace that!





“

... no matter what you do to the source, if you don't pay attention to how you listen to music, you'll miss half the equation.

”



**The thing is,  
what's changing  
photography is  
not software.  
It's your mobile  
phone.**



# About Photography and Photoshop

PAUL BURNETT,  
PRINCIPAL APAC EVANGELIST,  
ADOBE SYSTEMS

by *Marcus Wong*

**I think a lot of the early feedback about Creative Cloud has been: "Why do I have to pay a subscription for something that I've always owned." Has that changed by now?**

Well, you're right. When we first released Creative Cloud to the market there was a lot of confusion as to why we were doing this. And I think a lot of the confusion around it all was that our vision of Creative Cloud was not 'the' Creative Suite.

You used to buy a box of software off the shelf and there were problems with that. We'd sell you a new update after one or two years and the thing is the industry has gone through a lot of changes.

Surveys showed that changes have been coming faster in the last five years than in the last eighteen or fifteen years, but we were legally unable to add features after we provided a new release. It's a tax law: once someone pays for something, you can't give him bits to add to it, you have to wait for the next release.

By changing to a subscription model, it enables us to release updates once they're available, so when there are new devices or new formats we can release updates to

make things easier for our users straight away. And in fact, over the last three or four years we've released thousands of updates to the product, and we could never have done that with the old model.

**There seems to be so much you can do with Photoshop these days. Do you think this takes away from what "photography" is?**

It's very interesting. In the world of photography there is this big extreme area. On the one end, there are photographers who will say: "Whatever I take in the camera, is the shot that I should publish."

On the very other end of the spectrum, there are people who say: "I took this shot of a mountain the other day but the clouds weren't so great, but I had another shot I took two months ago where the clouds were awesome so I'll just put the two together."

So really, are they photographers? Are they not? I'm not going to agree or disagree with what they do. Some people will say it's art. And that's totally legitimate because there are people who do incredible work with compositions.

But it's not black and white

because there are in-betweens too. For example, with a portrait: there's a hair across the face. Can I get rid of that? My view is: live and let live. At the end of the day, if people are creating beautiful work, I'm all for it.

**At the end of the day it's all still photography?**

The thing is, what's changing photography is not software. It's your mobile phone. And the photos you get with it are pretty good. Seriously! Some of the photos people are taking with their mobile phones are really good.

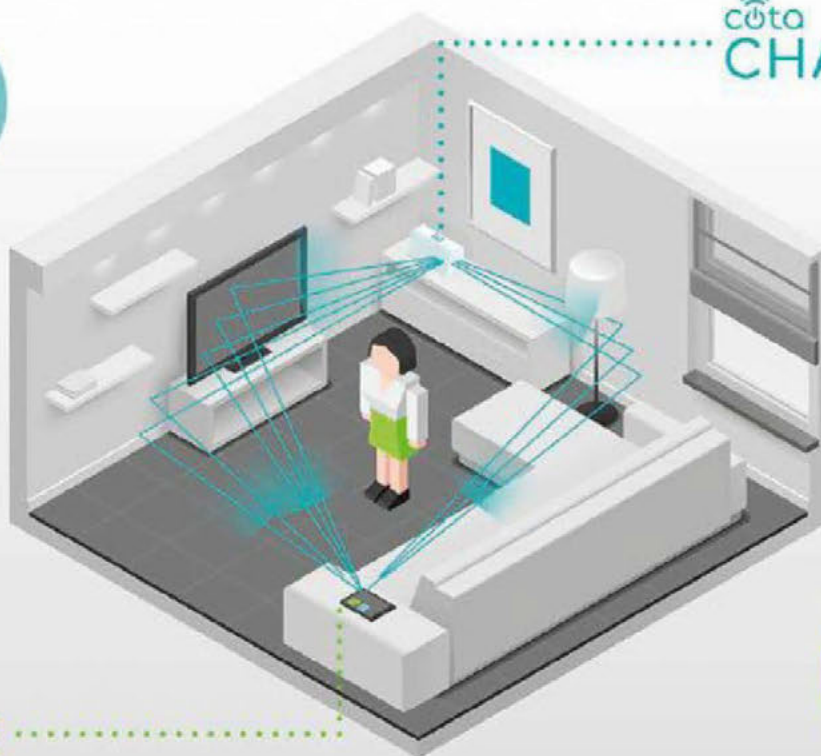
More people are taking photos now than ever before. So what is photography? If you talk about professional photographers, they have a skill and a style and it's not that you can't learn and gain and become better at it. But it's the thing that sets the pictures in the magazine aside from what I see on Facebook. It's the eye and the style.

You can learn that. You can learn to take better raw captures, and the edit can be better too. That's what we're working on too, from professional photographers to people who just take happy snaps, hence our new tagline: "Take it, make it".





cota  
CHARGER



DEVICE

# LONG-RANGE WIRELESS CHARGING

by James Lu

**■** Imagine power being delivered through the air, without the need for any cables or charging pads. That's what Ossia's Cota wireless charging technology can do, and it's available this year.

The Cota has been in development for ten years and in its current form resembles a cylindrical tower, about the same size and shape as the Mac Pro. Inside the Cota are hundreds of omnidirectional antennas that can beam radio frequency waves over 2.8GHz at 100Hz, well beyond the interference range of Bluetooth and Wi-Fi.

The waves carry a power charge, capable of delivering 1W of power wirelessly up to a range of 10 meters, but they aren't on all the time. To ensure safe charging, the Cota only sends out a power charge when it

receives a signal connection from a device. If that signal isn't detected – if it's blocked by a person standing in the way, for example – the power won't be delivered. The Cota isn't limited to smart devices either, it can charge virtually anything that can be fitted with a receiver chip, including digital cameras, remote controls, electric toothbrushes, smoke detectors and IoT devices like thermostats and electronic locks.

The Cota itself is scheduled to enter production around Q3 this year, while the receiver chips are already being produced. According to Ossia, the first-generation of Cota products will mainly be accessories, such as smartphone cases, with the receiver chips inside them. If all goes well, next-generation devices will already have Cota chips built into them.

## TOP 3 GEAR VR APPS

You can download apps and games for the Gear VR through the Oculus Store. Here's our pick for the best of the best:

### Netflix for Gear VR

The Netflix app transports you into a virtual world, where you can steep yourself into your favourite TV shows and movies, on a huge TV screen. You can also activate the Void Theatre mode, which plays video in front of your eyes without any distractions, letting you lose yourself in a film. Please go to [www.netflix.com](http://www.netflix.com) for plans and prices.



### Samsung Internet for Gear VR

Dive into Samsung Internet for Gear VR, a web browser designed for VR. The app supports both 360-degree and 3D video streaming, as well as HTML5 videos from the web. The app also provides voice recognition, along with an on-screen keyboard, to make text input intuitive and easy. With the Gaze Mode, you can select menus by simply gazing at them.



### Gunjack

Strap on the Gear VR and become a gunjack in space. In this action-packed arcade shooter, you have one job: defend your mining platform from deadly enemy ships by blasting anything that moves. The intense gameplay makes you feel like you're right in space, with intuitive one-touch controls for immediate action, and multiple missions with bonus levels for endless variety.



# THE FUTURE IS NOW

Experience new worlds with the Samsung Gear VR.

The Samsung Gear VR is the best way to journey into new virtual worlds today. With a compatible Samsung Galaxy smartphone and just S\$148, you can dive into an incredible experience of riveting movies and immersive gaming.

Virtual reality, or VR, creates a simulated environment that places you inside a virtual world. You're no longer just viewing a scene; you'll feel like you're really there. You'll swim through the depths of the ocean with dolphins around you, fight in epic space battles, or walk next to colossal dinosaurs, while seated right in your living room.

The Gear VR, powered by Oculus, creates that virtual world through a wearable headset that weighs just 318g, and features a foam cushioning around the eyes for comfortable extended usage.

On the front of the device, there's a

slot for your Samsung Galaxy Note 5 4G+, Galaxy S6 edge+ 4G+, Galaxy S6 edge 4G+, or Galaxy S6 4G+.

The headset offers a 96-degree field of view, and thanks to your Samsung Galaxy smartphone's SUPER AMOLED display, colors are rich and vibrant, and details sharp and lifelike. The headset's accelerometer and gyroscope know exactly where you're looking and how your head is moving at any time, so what you're seeing constantly changes to match your movements.

To control the UI and apps, you can use your gaze, or tap or swipe on the touchpad. To enhance the immersion, the Gear VR is best used with headphones. You can also connect a Bluetooth® gamepad for better control.

Immerse yourself with the Samsung Gear VR, and enjoy new worlds unlike anything else you've ever experienced.

Bluetooth® is a registered trademark of Bluetooth SIG, Inc., and any use of such marks herein is under license.

All other company, product and service names mentioned herein are marks, trademarks, registered trademarks or service marks of the respective owners.

Samsung Gear VR is not recommended for children under 13 years, please see doctor before use if pregnant, elderly and/or there are heart, epileptic or other medical conditions. Detailed health and safety warnings apply, please see <https://oculus.com/warnings>.



FEATURE

# Get Creative with Color Photography

■ From the cool blues of an evening sunset, to the glowing yellows of a warm morning, colors evoke mood and emotions in any photograph. Here's how to shoot images that show life in vivid color.

Text & Photographs by *Alvin Soon*

All photographs shot with the *Olympus Pen-F*





# Getting Color: The Color Wheel Explained

*How colors work together (or not).*

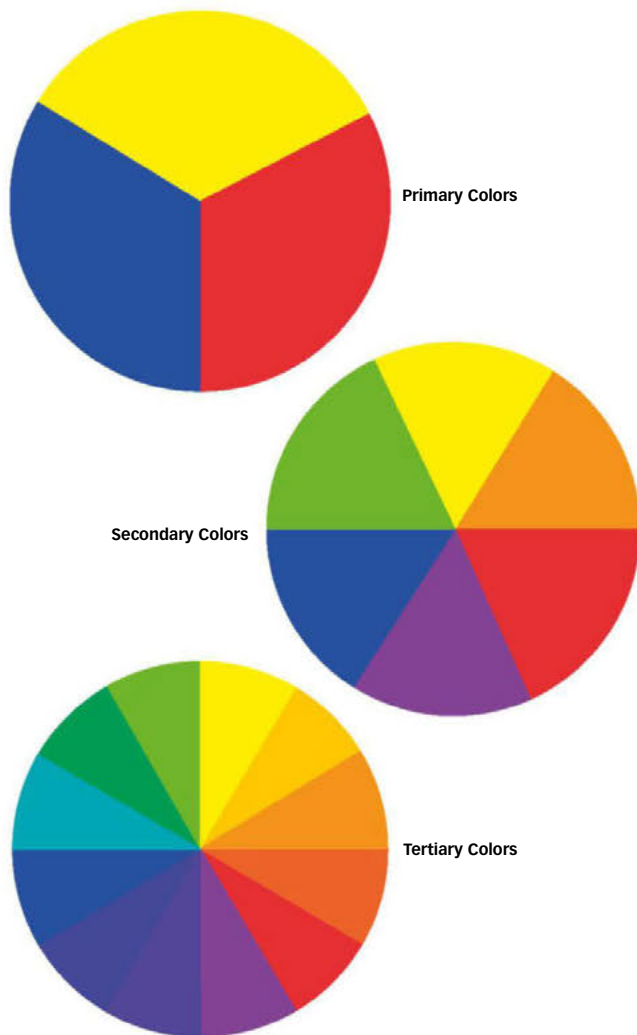
## How colors work together (or not)

Put different colors together, and you evoke different moods and feelings. Color theory explains why, and the color wheel explains color theory.

## What's a color wheel?

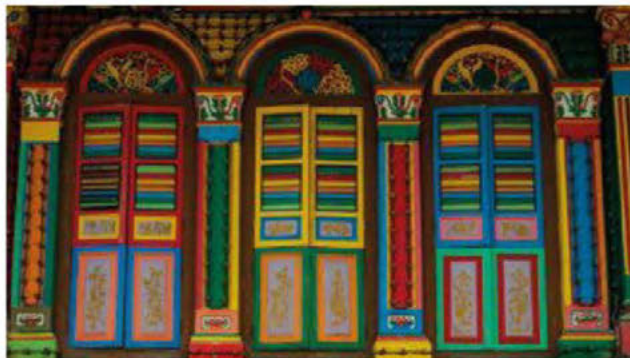
A color wheel illustrates the relationship between primary, secondary and tertiary colors. The primary colors are red, yellow and blue. Secondary colors are colors formed by mixing the primary colors, green, orange and purple. Tertiary colors are created from mixing primary and secondary colors.

There are actually many different kinds of color wheels, but what's important about any color wheel is the way it shows you how complementary colors, analogous colors, and warm and cool colors, work.



## Complementary colors

Complementary colors, sometimes called contrasting colors, are colors that lie opposite each other on the color wheel. For example, blue complements orange. These colors pair well together, and make the other look more vivid.



## Analogous colors

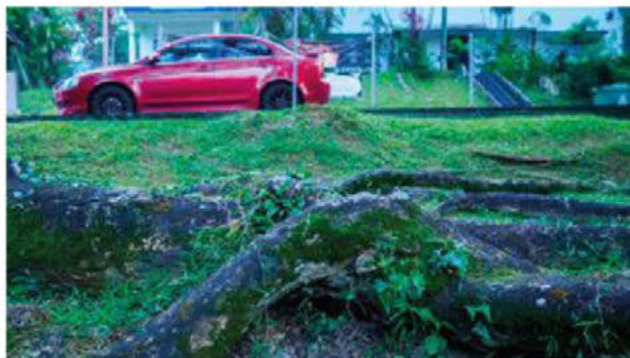
Analogous colors are those that lie side by side on a 12-part color wheel. They look harmonious together, but create little contrast. For example, orange and red look good next to each other, but they also look similar.



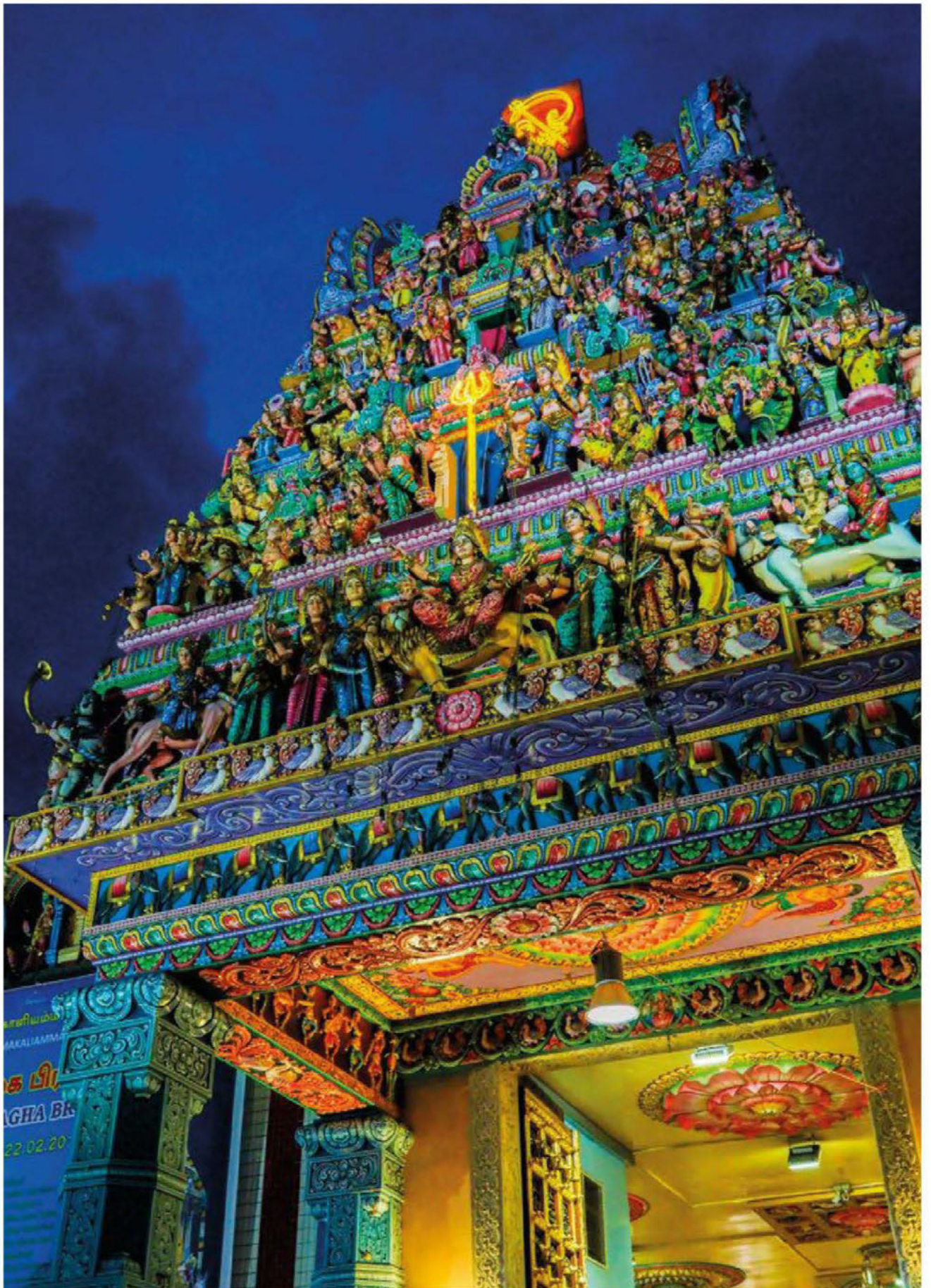
## Warm and cool colors

Warm colors are the colors from red through yellow, with browns and tans included. Cool colors are the colors from blue-green to blue-violet.

In general, warm colors attract more attention and will appear closer to the viewer, even if they're actually in the background. Cool colors tend to recede into the background. Placing warm and cool colors together creates strong contrasts.









# 7 Ways to Get Creative with Color

*How to shoot images full of expressive color.*

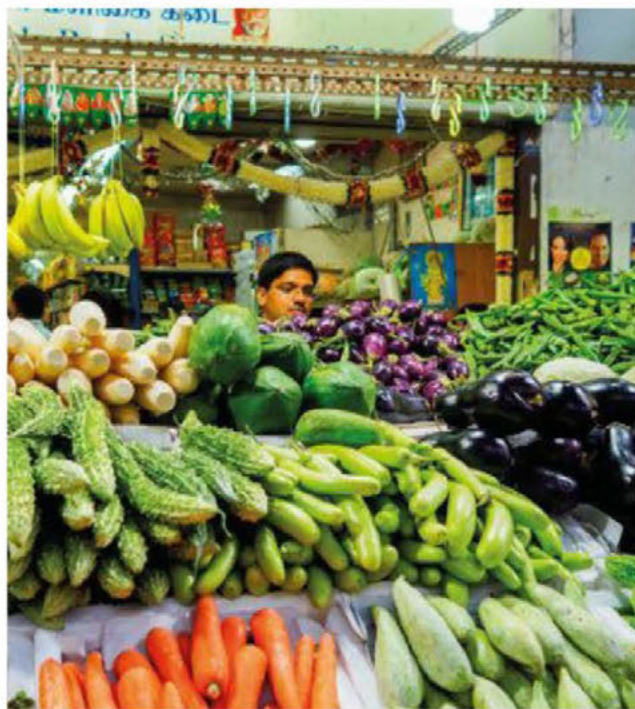
## 1. Shoot complementary colors to make subjects pop

Shoot complementary colors against each other to create standout contrasts. For example, put green subjects against red backgrounds, or yellow next to purple subjects.



## 2. Group similar colors together to create harmony

Instead of creating contrast, group analogous or similar colors together to create a harmonious photo.



## 3. Shoot one dominant color

Instead of finding complementary or analogous colors to match, you can also look for compositions with a single color that dominates the photo.





#### 4. Add a dash of color

Add a dash of color to an image to create contrast and draw attention to the color. The Olympus Pen-F let me do this in-camera, with its Partial Color Art Filter.



#### 5. Shoot warm colors for vibrant images

Create vibrant, upbeat images by shooting photos full of warm colors, from reds to oranges to yellows.



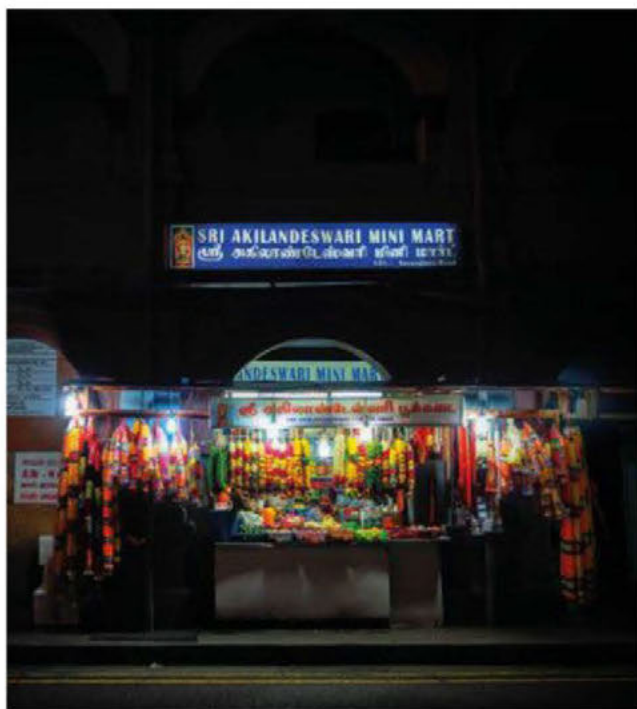
#### 6. Shoot cool colors for solemn moods

Or do the opposite, by shooting images that are full of cool colors, to evoke a more somber, tranquil look.



#### 7. Find bright and dark contrasts

Looking for complementary colors is one way to create contrast. Another way to create contrast is to find compositions with bright and dark lighting contrast as well as color contrasts.



# Get Creative with Color Impressions

*How to make abstract photos that are all about color.*

Make photos all about colors by making the subjects abstract. While photographs are traditionally about subjects in sharp focus, color impressions create photos that are intentionally blurry. Here's how to do it.

## 1. Create impressions by going out of focus

It's usually a big sin to have your subject out of focus, but with colorful subjects, we can intentionally blur the image to create color abstracts. To do this, set your camera on manual focus, and use the lens' manual ring to blur the image to your liking.





## 2. Create impressions using camera movement

Another way to create color abstracts is to shoot with a slow shutter speed, and move the camera as the shot is being taken. You'll need to experiment, as different shutter speeds and varieties of movement will produce different results. There are a few ways to move the camera:

### i. Move the camera into the subject

Moving the camera towards the subject creates motion blur. You can also zoom the lens in, instead of moving the camera in, to create the same effect.



### ii. Move the camera in a straight line

Moving the camera in a straight line, horizontally or vertically, works well to emphasize subjects with strong leading lines.



### iii. Move the camera in a circular motion

Moving the camera in circles while the camera takes the shot can result in smooth and organic-looking blurs.



# When to Use Black and White

*How do you know when to remove color altogether?*

With all this talk about color, what about black and white photography? Not all shots lend themselves best to color; sometimes removing color altogether can make an image stronger. So how do you know when to remove color altogether?



## i. When colors overwhelm the main subject

One key reason to remove color is when it overwhelms the photo and takes attention away from the main subject.

## ii. When color isn't necessary

Another reason is when there's hardly any color in the image.

## iii. When you want to focus on forms, lines and textures

Shooting in black and white is a good way to put more focus on forms, lines and textures, which might otherwise be buried by distracting colors.

## iv. When there's a lot of contrast in the image

Black and white images work great when there's a lot of tonal contrast in an image, i.e., big differences in light and dark areas in an image.

## v. Preview and play

Some cameras, like the Pen-F, let you preview images in black and white before you shoot, so you can see if the shot works better in color or not. Try it!



# Shooting with the Olympus Pen-F

*First impressions of Olympus' new camera.*



All the images in this feature were shot with the Olympus Pen-F, and most of them were shot using the new film presets that ship with the camera.

I shoot all the time in raw and do my own post-processing. So I wasn't excited about the Pen-F's Creative Dial at first, which gives you quick access to the new Color Profile and Monochrome modes, as well as Art Filters and a Color Creator mode.

That's why I was quite surprised by how often I turned the dial to the Color Profile and Monochrome modes, when shooting with the Pen-F. The Color Profiles simulate the look of film, and I came to enjoy their colors. It was also quite refreshing to view the world through black and white in Monochrome mode, which simulates the look of classic black and white films.

Because the colors are saved to JPEG, I still saved the original shots by setting the camera to shoot in raw with JPEG. But I liked the colors often enough that I didn't have to do much with the JPEGs in post anyway. This came as both a pleasant surprise and a nice time-saver.

The rest of the Pen-F handled beautifully, and is itself a beautiful camera, following the lines of the original Pen F from 1963. It's compact and lightweight, making it easy to carry around and remain inconspicuous in crowded areas. I'm still impressed by how many small lenses I can pack into a bag, and how sharp and full of character Olympus' prime lenses are.

The new 20MP sensor, which doesn't have an optical low-pass filter, captures a good amount of detail. Auto-focus is quick, and I appreciate how quickly you can take over focus points with the touchscreen and four-way controller. The class-leading five-axis optical image stabilization helped me nail clearer and sharper images in low light than I'd usually hope to get.

As first impressions go, the Olympus Pen-F is off to an impressive start. Look forward to our review of the camera in a future issue of HWM. **HWM**



TAP FOR  
GALLERY





## RESULTS ARE IN!

The annual HWM+HardwareZone.com Tech Awards is back once again to honour all the revolutionary products and technologies launched in the past year! Find out what our editors and tech gurus favour in the Editor's Choice Awards, and how your favourite bands fared in the Readers' Choice Awards.

**If you have voted in our Readers' Choice Awards, you may be one of the lucky winners to bring home prizes worth up to \$6,000!**

The complete results will be published in our April and May 2016 issues. Can't wait for our next issue? Visit [www.hardwarezone.com](http://www.hardwarezone.com) to find out the winning brands and products and how they fare against competition. Plus check out the video highlights and photos taken at the event!



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GAMEA:IS



# UPGRADING YOUR SMARTPHONE CAMERA

by Liu Hongzuo

Smartphone cameras have only been getting better with the times. But there's only so much their makers can include to keep the smartphone portable. However, travelers always have a little more room and many more reasons to take better photos for their trips. Here are some must-have accessories if you want to make the most of your smartphone's camera and your travel memories.



## EASY MACRO

[WWW.EASY-MACRO.COM](http://WWW.EASY-MACRO.COM)

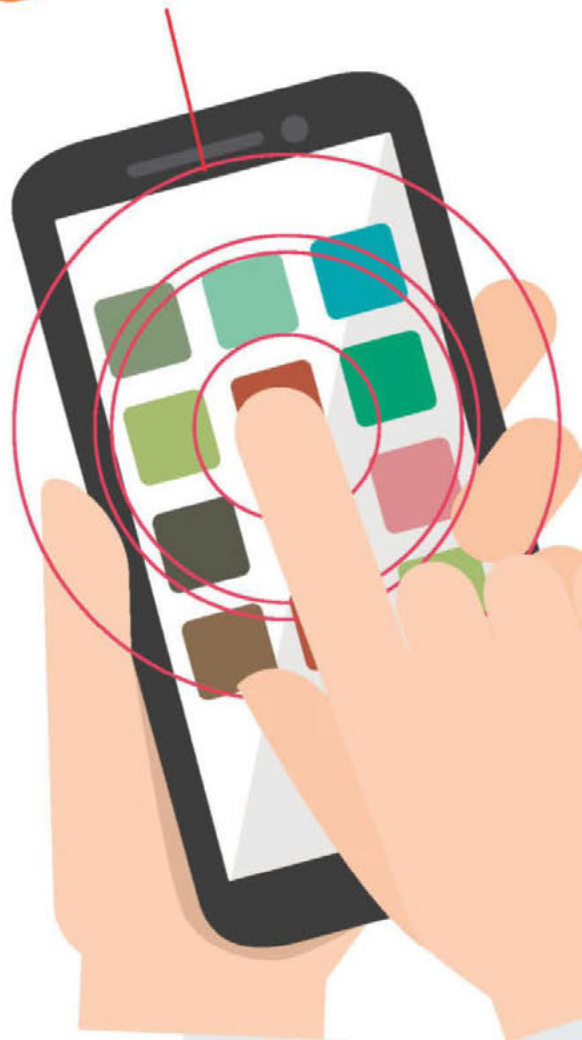
It's always the details that make a trip memorable. Easy Macro takes care of the small things simply because the phone can't focus on stuff that's too near, by default. Slip on this elastic band around your camera lens and you'll be taking Instagram-worthy photos on your trip. No tinkering, battery, or wireless tethering required. Keeping it away is as simple as putting it into your wallet or pocket, so you don't have to fumble about when a picture-worthy chance strikes.

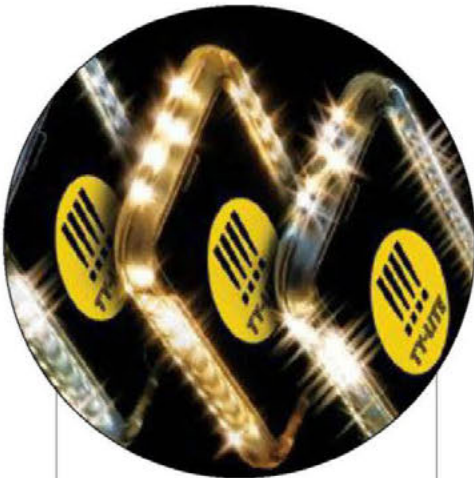


## HISY REMOTE

[WWW.HISYPIX.COM/SHOP](http://WWW.HISYPIX.COM/SHOP)

You'd never need photography help from strangers off a street after getting the HISY Remote. This little stub is a remote shutter for your smartphone - it connects using Bluetooth, and it comes in a discreet size that will never show up in your pictures. Set your phone up somewhere safe and start posing against impressive sunsets or mountain ranges, or have amazing group selfies without having to leave anybody out.





#### **TY-LITE PROTECTIVE CASE**

[WWW.TY-LITE.COM/PRODUCT/LIGHTED-CASE-IPHONE-6/](http://WWW.TY-LITE.COM/PRODUCT/LIGHTED-CASE-IPHONE-6/)

This phone case doesn't simply protect the device – it can double as a fill light for your selfies. The Ty-Lite gives off three different light profiles, which helps to perfect your selfie's style and mood. We know that this is the real deal since the accessory was designed by Beyoncé's stylist. If you're also the real deal, you won't settle for basic – why add an artificial filter to your photos when you can have real 'studio-like' lighting? Dazzling your Instagram followers can be easily done now, especially when using a comprehensive selfie lighting accessory for travels.



#### **IBLAZR 2**

[WWW.CONCEPTER.CO/IBLAZR2](http://WWW.CONCEPTER.CO/IBLAZR2)

Why take a chance with ambient light when you can have a pocket sized LED flash? The iBlazr 2 is an ideal flash solution for smartphone shooters who want quality for travel photos. The 40mm flash module gives a burst of white light when attached to your smartphone or tablet via Bluetooth.

This new model lets you attach multiple iBlazr2 units around the perimeter of your device, allowing you to scale up the flash based on your requirements. With it, there'll be no more dimly-lit photos of places you might never visit again.



#### **SUPER SPY ULTRA HIGH POWER ZOOM 80X TELESCOPE WITH TRIPOD STAND**

[SHOP.BRANDO.COM](http://SHOP.BRANDO.COM)

Is your phone's built-in zoom not good enough for you? Attach an 80-times zoom lens instead. The Super Spy Ultra High power Zoom 80X Telescope lens is so powerful that their makers included a tripod, a specially designed phone case, and even a pouch for making the most out of your shots. Now you'll have something nice to show every time you return from an overseas hike or a one-night only outdoors concert. Just be mindful about buying the correct lens for the correct phone model.



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TEST

# LAB RESULTS

Every month behind the doors of our super secret gadget testing facility, the latest tech products are put through their paces using industry recognized benchmarks and our own blend of real world usage scenarios. Here are our findings.

## HOW WE RATE:

Products are rated on a scale of **1** to **10**; **1** being so abysmal, it should be a crime to sell it, and **10** being almost perfect. Come now, nothing is perfect. An Editor's Choice may also be awarded based on unique merits.



## MORE INSIDE >

**ACER PREDATOR X34**  
34-inches of curved G-Sync goodness.

**ASUS ROG GX700**  
This is the water-cooled, overclocked gaming notebook you're looking for.

**LOGITECH CREATE**  
The better keyboard for the iPad Pro.



# SWEPT BY SOUND

One year on from their introduction, multi-room speakers have now become a norm. We're starting to see the introduction 360-degree sound on top of multi-room capabilities, so there's now a multitude of ways to fill your home with sound. We put the best of 2015's offerings to the test to find out which approach works best.

Text by *Marcus Wong*

Photography by *Zaphs Zhang + Jasper Yu*

Art Direction by *Ian Chong*





VS  
ARCHT ONE WIRELESS 360° AUDIO SYSTEM  
•  
BOSE SOUNDTOUCH 30 SERIES III  
•  
SAMSUNG WAM7500  
•  
SONOS PLAY:5  
•  
SONY SR5-X99  
•  
YAMAHA ISX-80



## ARCHT ONE WIRELESS 360° AUDIO SYSTEM

The Archt One is the first product from Archt Audio, and one of the first speakers to boast 360-degree sound capabilities. Basically, the speaker uses a patented sound array to send sound all around it. The drivers face upwards instead of out, and fire sound waves at the ring that disperses it in a 360-degree manner, so you can technically place the speaker anywhere and still get the same quality of sound wherever you are in the room.

Built to be simple to use, there aren't many obvious buttons on the speaker itself. Main controls (volume up/down, pause/play and source) are by way of touch capacitive areas on the sound array (one in each direction). Surprisingly enough, its companion app doesn't offer much in terms of playing audio, but rather is meant to calibrate the speaker to best match your room by using the microphone on your phone to record how sounds from the speaker are reflected off the walls.

Apparently, this calibration also determines the nature of the audio you'll get. Placed in the center of the room, the speakers will calibrate

for even distribution. Place it in the corner of the room, and it will calibrate for maximum bass impact, using the nearby walls for boost. Stereo pairing is also an option via Bluetooth, so if you pick up two of these speakers you can choose to have them as a stereo pair.

Inside, the speaker features a set of full-range drivers in the cone, a subwoofer below the sound array, and a passive radiator right at the base; helping the speaker achieve a claimed frequency response of 35Hz to 20kHz. The speaker is also rated for a max output of 100dB, which is surprisingly loud for something that's seemingly so slim.

Setting up is a very simple process over Wi-Fi. You simply plug it in, turn it on, and ensure that it's on Wi-Fi mode. The

speaker will be picked up by iOS devices as an Airplay device, which is also how it offers multi-room support for now – via Airplay through iTunes. The company is currently developing an app update to allow for direct multi-room control, so hopefully that comes in soon as you'll need additional software (like Whaale) to transmit different songs to different speakers.



**In-built support for audio calibration is a nice touch.**



**No true app support yet as it lacks a dedicated app.**



### AT A GLANCE

#### Dimensions

18.5 x 18.5 x 43.3cm

#### Weight

3.64kg

#### Power Output

100W

#### Price

\$999



This silver ring is what supplies the 360-degree magic.



You can just about see the passive radiators at the base.



The USB port at the back is for updates only.



## BOSE SOUNDTOUCH 30 SERIES III

Externally, there isn't that much that's different with the new SoundTouch 30 this year from last. The series III edition still retains the same tried and tested design, with a slight update to the finish. Instead of a brushed metal finish, you now get what seems to be a patterned finish. Even the remote control hasn't changed much, other than the fact that a Bluetooth icon sits next to the Auxiliary symbol for changing sources.

What has changed though, is that the SoundTouch 30 now supports multi-room streaming control over Bluetooth as well as Wi-Fi. Changes have actually been worked throughout the entire series of SoundTouch systems so the new systems are backward compatible with them, meaning you'll

just need one series III speaker in your home to get Bluetooth control over all your systems.

The Wi-Fi support has also been upgraded to give you better range and reliability, as the connection is now based on the 802.11n dual-band protocol, and the inclusion of 5GHz support allows for stronger connections in light of the crowded Wi-Fi environments of today's apartment buildings.

Setup was again a breeze, and perhaps

even faster this time over Wi-Fi as the system was quickly picked up once we updated the desktop app on our laptop hosting our iTunes Library. Nothing much has changed on the interface side too, as you again are presented with six channels that you can preset audio sources. Once stored, the channels remember

which sources you set them to and store the connection, so you can play the sources right from the speaker without further setup. Pressing one of the buttons on the speaker immediately starts it playing, provided the source is available.

Again, the changes here are what you don't see. Where there wasn't really proper support for High Resolution Audio in the previous series, the current generation of SoundTouch 30s will support

both FLAC and ALAC formats so you have additional playback choices this time. On our own testing, it does seem like the new systems support 192 kHz/24 bit audio files, so that another plus.

It's also interesting to note that the speakers have come down slightly in price, from \$1,099 for the series II to \$999 in the current series, making it better value for money.



**Much improved connectivity options over the previous version.**



**Number of streaming services supported is still low.**



### AT A GLANCE

#### Dimensions

24.6 x 43.5 x 18.0cm

#### Weight

11.7kg

#### Power Output

N/A

#### Price

\$999



Bose's six hot key setup again makes an appearance.



The changes in design are slight, but welcome.



The remote layout resembles on-device buttons for a more seamless user experience.

## SAMSUNG WAM7500

The Samsung WAM7500 represents quite a change from last year's WAM750 both in terms of design and approach. Whereas last year's model was an early attempt to get into the multi-room streaming audio segment, the WAM7500 represents a move to step ahead the competition by offering 360-degree audio.

The new WAM7500 also looks drastically different. It now looks like an elongated egg of sorts (some might say a space ship), with a gap at the bottom which houses the radiator ring that's responsible for dispersing the sound all around. You won't see any of the drivers on this speaker; those are all housed within the body of the speaker, hidden beneath the resin shell.

There aren't many buttons visible either, as Samsung has opted to go with just two thin slivers of silver on the body for the volume controls. Everything else (i.e. the power, source and play/pause controls) are available by way of touch areas on the body. For most cases, this works fine, but we must say trying to "hold" buttons down to activate pairing feels rather unintuitive. Half the time, you're not sure if your finger is over the right spot or not!

That aside, we must say we quite like the design of the WAM7500. It's solidly built, and the base is sturdy enough so you don't really worry about it toppling. We've seen pictures where the speaker is hung upside down and mounted on a more designer-style stand with long legs, so clearly it's a design that lends

itself well to any modern home environment.

The app interface has also been updated slightly too. The virtual scroll wheel still dominates most of the interface, but now, tapping anywhere beside it reveals a more traditional timeline interface that you can easily scrub back and forth. It seems the quirk we found from testing the WAM750 has also been resolved, as selecting any track to play now replaces the album you're currently

listening to with the album of the new track selected.

However, the app doesn't quite seem to be the most robust as we found it would lose the pairing if we ran it alongside the apps for other speakers. That wouldn't be a problem if it just lost the connection, but it lost the pairing completely, leaving us to go through the entire setup process again.

**+**  
**Greater flexibility in speaker placement as 360-degree feature works well.**

**-**  
**Lower-mid to bass performance could be more robust.**



### AT A GLANCE

#### Dimensions

18.1 x 42.2 x 18.1cm

#### Weight

3.4kg

#### Power Output

N/A

#### Price

\$699



In this gap is a radiator ring that disperses the sound all around.



Only the volume controls have physical buttons.



The top vent also helps in sound dispersion.



## SONOS PLAY:5

It's been a while since we've had an update to the Sonos series of speakers, and that probably gave the rest of the competition a chance to catch up as we saw new players from the likes of BlueSound and Lenco throw in solid offerings last year that not only did multi-room audio, but offered full support for High Resolution Audio (HRA) too.

That's changed somewhat with the new Play:5. It now supports HRA streaming, with the capability to play WMA, AAC, Ogg Vorbis, Apple lossless, FLAC, and uncompressed WAV and AIFF files, but only at sample rates up to 48kHz, slightly higher than the 44.1kHz sampling of PCM audio.

The speaker now sports a brand new design internally and externally. The base port is gone, and the speaker now has a full design which according to Sonos, allows the speaker to produce even deeper bass than their Playbar. It looks sleeker overall, and works in both horizontal and vertical orientations; the latter being the recommended option if you're going to do stereo pairing.

Internally, the drivers have also been slightly readjusted to better radiate sound

in all directions. Sonos says the new Play:5 offers the best off-axis performance amongst all their players, so that's perhaps a nod to the growing trend of 360-degree audio. In any case, the new Play:5 certainly has no issues filling rooms with sound and it seems easily more powerful than the previous version.

As before, the new Play:5 retains a simple interface, with just two buttons for volume control and a play/pause button on the top. These have gained a slight upgrade though; with capacitive pads replacing the old physical buttons so that controls work via touch.

Attention to detail is certainly evident on this speaker, as even the logo—that appears dead center on the speaker—has had some 800 holes laser cut into it, so that it

meshes well with the 60,000 holes in the grill to allow sound to pass through unhindered.

The app interface remains largely unchanged, but you now have the option to use your smartphone to perform audio calibration for your speaker. Called TruePlay, this measures the audio characteristics of your room so it can best tune your Play:5 for optimal performance, much like what we found with the Archt One.



**Supports the most streaming services.**



**Audio could do with a bit more detail and finesse.**



### AT A GLANCE

#### Dimensions

20.3 x 36.4 x 15.4cm

#### Weight

6.36kg

#### Power Output

N/A

#### Price

\$999



Sonos has gone with touch controls with the new Play:5.



Even the logo is perforated so it doesn't disturb the sound.



The rear is very clean, with just an Ethernet port.

## SONY SRS-X99

The SRS-X99 is the largest speaker in Sony's wireless speaker line-up, and has the clean modern look that's shared throughout the line-up. Certainly, apart from size, there is little to tell between the SRS-X99 and the SRS-X88 speakers, and that's not necessarily a bad thing. The gloss top matches well with the brushed aluminum finish on the sides and back, making for a classy looking speaker overall.

Looks aside, the speaker certainly boasts an impressive number of drivers, with one main woofer flanked by two passive radiators for deep bass, two mid-range magnetic fluid speakers for vocals and crisp mid-range performance, plus four super tweeters for "ultra-high frequencies". These super tweeters are split evenly between upward facing and front facing, allowing for better dispersion of sound across the room.

Sony has long been a proponent of HRA, and it certainly shows as the SRS-X99 offers full support for eight of the most popular music formats in both compressed and uncompressed form (AAC, WMA, AIFF, ALAC, DSD, WAV, MP3 and FLAC). Further to that, it also takes advantage of Sony's latest LDAC codec to transmit data at three times the

rate of existing wireless technology, ensuring that your audio isn't down-sampled during transmission.

It also gains Sony's latest audio codecs like S-Master HX, DSEE HX, and ClearAudio+, which together promise optimal clarity and separation with minimal distortion and noise for full-bodied sound. DSEE HX in particular is an interesting technology as it's said to upscale existing music to near high-resolution quality.

Like the Bose SoundTouch 30, the SRS-X99 also comes with a remote control, though this is a long and slim affair that offers you basic play back controls and the relevant source buttons and nothing else. The multi-room magic obviously happens via Sony's SongPal app, which

is thankfully a pretty well designed affair. Speakers and music sources are assigned to groups you can name, and you can easily switch speakers from one group to another. Having the entire group play to same song is as simple as assigning it to one source, and overall this was probably one of the easiest ways to manage speakers and sources.

Setup was also a fairly simple, as the app quickly picked up the SRS-X99 once it was on the network, leaving us to just follow the on-screen instructions.



**SongPal app is well thought out and easy to use.**



**Soundstage could be wider.**



### AT A GLANCE

#### Dimensions

43.0 x 13.3 x 12.5cm

#### Weight

4.7kg

#### Power Output

154W

#### Price

\$899



These touch controls only light up when active.



The SRS-X99 has two obvious up-firing super tweeters.



There's an added antenna for better wireless connection.

## YAMAHA ISX-80

Though it shares design cues from the ISX-800 from 2012, the ISX-80 represents the start of Yamaha's foray into multi-room audio, and they're doing it in a big way.

You see, Yamaha has just launched their own version of wireless multi-room technology – MusicCast – and this technology allows you to network MusicCast-enabled audio equipment and the non-MusicCast equipment connected to them.

This means you can mix and match all sorts of AV systems that you can then control from a single source, as long as they're connected in some form to a MusicCast device. Because every MusicCast-enabled device has both Bluetooth and analog connections, anything from a traditional vinyl player to a pair of standard wireless headphones can now be part of your multi-room network, so that's certainly an exciting prospect.

The ISX-80 speaker itself actually looks more like a modern wall clock than your typical speaker with its square frame and fairly large digital clock in the center. It has a very clean industrial look overall, with just six physical buttons dot the top of the speaker. A refreshing change to the more modern looks

sported by the rest of the offerings in this shootout perhaps?

That said, Yamaha has somehow managed to fit in dual 3cm soft dome tweeters and dual 8cm woofers in that unconventional frame and thus provide a fuller sound than what you might expect from something that measures

just 6.5cm deep, so kudos must be given there.

There's support for streaming services like Spotify, Pandora, Rhapsody, Napster, SiriusXM, and Juke, plus the speaker has native support for MP3, WMA, MPEG4, AAC, ALAC, WAV, FLAC and AIFF formats in up to 192kHz/24bit encoding. It's also the only speaker to have a FM tuner built in, so it's obvious to see the lifestyle focus of this speaker.

We must also commend Yamaha for their MusicCast Controller app. Speakers are assigned to various rooms, and then these rooms are in turn assigned a source to play. To have multiple rooms playing the same source, simply click the link icon on the top left to pick a master room, then add the selected rooms to link to it. A nice touch here is that you can personalize the rooms on the app by adding your own photos for use too, so everyone can have their own icon.



**MusicCast technology makes for great versatility within the system.**



**Sweet spot for the speaker seems to be rather small.**



### AT A GLANCE

#### Dimensions

30.2 x 30.2 x 6.5cm

#### Weight

3.3kg

#### Power Output

30W

#### Price

\$739



A row of physical buttons line the top of this speaker.



The ISX-80 features an actual LED clock in its center.



The remote is simple but adequate.



## AUDIO PERFORMANCE - ARCHT ONE WIRELESS 360° AUDIO SYSTEM

When the Archt One was launched, the Archt Audio team placed a lot of the marketing emphasis on the quality of the audio produced by the system. Now that we've had a chance to put the speaker through its paces somewhat, we're pleased to say that this newcomer does indeed have some audio chops, though they're not quite enough to justify the price. You get a good deal of mid-range clarity, and ample bass to boot. For example, when you listen to a recording of *I Love Paris* by Johnny Frigo, it's fairly easy to pick out each instrument amid all the musical frenzy. Moving on to our own formal testing, the speaker seemed to perform best on Buckethead's *Sail on Soothsayer* as it gave good performance on both the high-mids and the low end, with good body in the bass notes. If anything, we'd say the speaker was just a touch too bright for our liking, so we'd stick to tracks that focus mostly on the mid to low end like pop or rock or even electronic dance music with its heavy thumping bass.



## AUDIO PERFORMANCE - BOSE SOUNDTOUCH 30 SERIES III

The Bose SoundTouch 30 (series II) did very well in last year's shootout, impressing us with its lower-mid to bass range, and the excellent job it does with vocals. We do have to say that largely carries over to this year's series III version too, which isn't a bad thing. You get good warmth and sweet vocals, as well as good clarity on the highs. For example, with Leny Andrade's *Maiden Voyage*, the cymbals seem to ring out and linger as Leny's vocals come in, all the while underscored by the steady drum work. It's almost as though you can see the drummer working his wire brush while the pianist tinkers away beside him. No surprise then, that the speaker again performed best on *Hotel California* by The Eagles in our formal testing, as the piece plays perfectly into the strengths of the speaker. Crisp mid-high notes of the various guitars at play, and soulful vocals of Don Henley as he leads you through the song. More importantly, there's good separation between the instruments and the vocals, and great atmosphere as the cheers of the crowd still remain distinct.



## AUDIO PERFORMANCE - SAMSUNG WAM7500

We'd tested the WAM6500 before this, and weren't that impressed by the quality, but thankfully the WAM7500 served up much better performance. There's a good sense of naturalness on this speaker, with a focus on the mids to highs. Vocals are fairly warm, but seem slightly laid back for some pieces, and you may find yourself hoping for a bit more bass kick at times. For example, we put on a recording of Adele's *Turning Tables* off her *Live at the Hammersmith* album, and the string work on that piece was very nicely resolved, while Adele's own vocals only just about had enough presence to not get lost. This speaker is certainly not one you'd turn to if you want deep booming bass; for that you'd look to the Sony or the Bose. However if you're looking for a nice mid-upper bass register with clear mids and bright highs, then the WAM7500 will certainly impress. This is another speaker that performed best on *Hotel California* as the speaker renders good detail in the guitar work; especially in the solos that so signify the piece.



## AUDIO PERFORMANCE - SONOS PLAY:5

The new Play:5 was advertised as having the best sound of the entire Sonos lineup, and it certainly seems like it lives up to that claim. It's a speaker that can easily fill a room with sound, thanks to the multitude of drivers Sonos has thrown in. The improved tuning also means you get nice warm vocals with good clarity, as well as fairly good midrange performance and details. For example, on Rebecca Pidgeon's *Spanish Harlem*, you can fairly easily pick out the finer details of the piece, like the resonant twang of the bass guitar, and the tinkle of the piano. The speaker also extends very low into the bass notes, but oddly it seems the quality is focused solely on the low end while the lower-mids aren't quite as full as they should be. On our own formal testing the speaker performed well across all the tracks, with the exception of *Sail on Soothsayer* by Buckethead, where we felt the solo could have done with a bit more ring. Overall, this is a speaker that provides plenty of energy, but could do with a touch of subtlety.



## AUDIO PERFORMANCE - SONY SRS-X99

The SRS-X99 seemed ready to impress with its multitude of drivers and additional support for wireless streaming via LDAC, and we certainly had nothing to complain about when it came to streaming audio. There's good presence in the lower-mid to bass notes with this speaker, and vocals are nicely rounded. There's also plenty of power when you need it, and these audio characteristics lend well to anything from pop, rock, and even jazz standards. For example, a recording of *Cheek to Cheek* by Lady Gaga and Tony Bennett carried a great deal of energy and life, and you could almost feel the joy the two artistes had performing together. Toss on a classical piece like *Vivaldi - The Four Seasons: Concerto No. 3 in F major, op. 8 no. 3, RV 293, "Autumn"*, and the speaker happily obliges. Where it loses out surprisingly, is in the amount of body in the final sound. Compared to the Sonos and the Bose, it also doesn't have as wide a soundstage, and that hurt it a bit on our formal test tracks like *Sail on Soothsayer*.



## AUDIO PERFORMANCE - YAMAHA ISX-80

We honestly wondered what sort of sound we would get out of the ISX-80 as the unconventional square frame of the speaker didn't seem to lend itself well to storing the necessary drivers. Thankfully though, we found in our testing that the speaker still manages to generate decent body on its bass notes. Where it does suffer, is in the width of the soundstage it can project. The audio from this speaker tends to be very focused to the front, and that's probably because Yamaha expects it to be hung from the wall as it fulfills its other function of being a clock. On our testing we found that the speaker performed best with pieces with heavy emphasis on the midrange. For example, it turned in a good rendition of Leny Andrade's *Maiden Voyage*, picking up the piano riffs and her little adlibs well. This again translated to our formal testing, as the track that it performed best on was *Hotel California* by The Eagles, as it does a good job of capturing the live atmosphere of the performance. Still, we could have done with more clarity and greater separation.



# T E S T - MULTI-ROOM SPEAKER SHOOTOUT

MODEL	ARCHT ONE	BOSE SOUNDTOUCH 30 (SERIES III)	SAMSUNG WAM7500
DRIVERS	One 80mm full range speaker, one 120mm woofer, one 150mm passive radiator	N/A	One 25mm tweeter, one 125mm woofer
DIMENSIONS	18.5 x 18.5 x 43.3cm	24.6 x 43.5 x 18.0cm	18.1 x 42.2 x 18.1cm
PORTS	1 x 1/8" (3.5mm) AUX input 1 x USB port	1 x 1/8" (3.5mm) AUX input 1 x Ethernet Port 1 x USB port (for setup)	N/A
SUPPORTED FILE FORMATS	N/A	MP3, WMA, AAC, ALAC	AAC, MP3, WAV, WMA, OGG, FLAC, AIFF, ALAC
SUPPORTED CLOUD SERVICES	N/A	Pandor, Deezer, iHeartRadio, Spotify, iTunes, Internet Radio	Milk Music, Pandora, TuneIn, Rhapsody, Amazon Cloud Player, iHeart Radio, Rdio, 8tracks, Spotify, 7 digital, Murfie
PRICE	\$999	\$999	\$699

MODEL	SONOS PLAY:5	SONY SRS-X99	YAMAHA ISX-80
DRIVERS	Two 20mm tweeters, one 23mm tweeter, and three 100mm long-throw mid-woofers	Two 19mm top firing Super tweeters, Two 19mm front firing Super tweeters, two 50mm midrange drivers, and one 94mm Subwoofer	Two 30mm soft dome tweeters, and two 80mm woofers
DIMENSIONS	20.3 x 36.4 x 15.4cm	43 x 13.3 x 12.5cm	30.2 x 30.2 x 6.5cm
PORTS	1 x 1/8" (3.5mm) AUX input 1 x Ethernet Port	1 x 1/8" (3.5mm) AUX input 1 x Ethernet port 1 x USB-A port 1 x USB-B port	1 x 1/8" (3.5mm) AUX input
SUPPORTED FILE FORMATS	MP3, iTunes Plus, WMA, AAC (MPEG4), AAC+, Ogg Vorbis, Audible (format 4), ALAC, FLAC, uncompressed WAV and AIFF files.	AAC, WMA, AIFF, ALAC, DSD, WAV, MP3, FLAC, L.PCM (WAV, AIFF)	MP3, WMA, MPEG4, AAC, ALAC, WAV, FLAC, AIFF
SUPPORTED CLOUD SERVICES	Spotify, Pandora, Deezer, TuneIn, SiriusXM, Google Play Music, SoundCloud, Amazon Music, iHeartRadio, Rhapsody, Rdio, Qobuz, Tidal and downloads from any service offering DRM-free tracks	Google Cast, Spotify, TuneIn, Pandora, Deezer and more via SongPal	Spotify, Pandora, Sirius XM, Rhapsody, Napster, JUKE
PRICE	\$999	\$899	\$739



# AND THE BEST MULTI-ROOM STREAMING SPEAKER IS



## BOSE SOUNDTOUCH 30 (SERIES III)

The SoundTouch 30 (Series III) serves up some subtle but welcome changes this year that put it on par with the rest of the competition. The new speaker brings Bluetooth and better High Resolution Audio support, and once again brought all-around performance that stood out from the competition. It does so at a slightly lower cost too, making it better value than before. We like that the performance translates across genres, and that, even with just the one unit you get quality room-filling sound. The one area where it could do with improvement is in terms of supported music streaming services. That's something it lags behind the competition. Still, it's hard to argue against quality, and this was clearly the most refined and versatile audio performer of the group.

## SAMSUNG WAM7500

It seems Samsung is serving up quite the selection of value performers this year, as the WAM7500 has turned out to be a very decent performer that held its own against some of the more established competition. It's served by a nice app and we're glad to see that they were able to work quickly to allow the speakers to perform without the hub unit, which was a major grouse with the last series. The implementation of 360-degree audio really does seem to work well, and we wouldn't be surprised to see more companies look towards this approach. Overall, we'd say the WAM7500 offers good value as it presents enjoyable renditions across most genres and gives you great sound no matter where you place it.



# THE ULTIMATE MOTHERBOARD SHOWDOWN

Every effort has been made to arm these new Intel Z170 boards to the teeth. As flagships of their respective brands, they feature excesses like a generally inordinate amount of power phases, and an assortment of dedicated overclocking buttons and knobs. But which one of these is the best?

*Text by Koh Wanzî*

*Photography by Zaphs Zhang + Vernon Wong*

*Art Direction by Ken Koh + Ian Chong*

**vs**

ASROCK Z170 OC FORMULA

•

ASUS ROG MAXIMUS  
VIII EXTREME

•

GIGABYTE Z170X  
GAMING G1

•

MSI Z170A GAMING M9 ACK



## ASROCK Z170 OC FORMULA

As its name suggests, the Z170 OC Formula has been designed unabashedly with overclocking in mind. The board boasts a 18+2 phase digital power design, with the two additional phases dedicated to the memory components. While the number of power phases is a poor indicator of a board's ability to support high overclocks, it does serve as a general guide of overclockability.

But power phases aside, the Z170 OC Formula also comes with a host of other features to improve stability. This includes 60A power chokes for cleaner Vcore voltages, premium memory alloy chokes to feed power more reliably to the memory modules, and dual-stack MOSFETs that double the die area over traditional MOSFETs and make power delivery for the CPU Vcore more efficient.

In addition, there is a wide selection of connectivity options, including a total of four PCIe 3.0 x16 slots, one PCIe 3.0 x1 slot, and one PCIe 2.0 x1 slot. There's even a vertical half-size mini-PCIe slot for a network adapter as the board lacks onboard Wi-Fi.

There's only support for two-way NVIDIA SLI, but if you did have four AMD cards, they could run in x8/x4/x4/x4 mode – not ideal, but it's workable. The Z170 platform really only

allocates 16 PCIe 3.0 lanes to the GPUs, so the second PCIe 3.0 x16 slot has been wired to the PCH to tap on the PCIe 3.0 lanes from the chipset itself.

Other standout features include the 10 SATA 6Gbps ports and three M.2 sockets that provide plenty of storage connectivity options. However, you won't be able to populate them all at once because of the finite number of PCIe 3.0 lanes available through the chipset,

so do take note which ports have shared lanes so you don't install your devices in conflicting ports.

Finally, the board features a plethora of dedicated hardware switches to allow quicker access to overclocking settings in an open test bench. The "+" and "-" Rapid OC buttons also allow you to tweak your CPU frequency in the Rapid OC Windows application by adjusting the base clock, CPU

multiplier, CPU core voltage and CPU cache ratio. Then there's the LN2 mode, Slow mode and XMP DIP switches and Direct Key button that let extreme overclockers resolve potential issues with LN2 overclocking or simply streamline the entire overclocking process.

And as expected of an overclocking-oriented board of this caliber, a dual BIOS switch enables you to switch between the two BIOSes and recover from failed overclocks.

**+  
Good overclocker  
with many  
dedicated controls.**

**-  
No onboard Wi-Fi.**



### AT A GLANCE

#### Memory

4 DDR4 DIMMs up to DDR4 4500

#### Expansion

4x PCIe 3.0 x16; 1x PCIe 3.0 x1; 1x PCIe 2.0 x1; 1x half-size mini-PCIe

#### USB 3.0

4x rear; 4x front

#### SATA

10 SATA 6Gbps

#### Price

\$540



There are a total of three M.2 sockets, the most out of all our tested boards.



Dedicated overclocking buttons and switches are found on the bottom right corner.



The onboard Purity Sound 3 audio solution can drive high impedance headphones up to 600ohm.

## ASUS ROG MAXIMUS VIII EXTREME

While the ASRock Z170 OC Formula was designed with overclocking in mind, the ASUS ROG Maximus VIII Extreme is an all-round premium board that is intended to offer the best performance to both gamers and overclockers. It is also one of two E-ATX boards in this shootout – ASUS apparently needed more space to cram extra goodies on board.

The board utilizes a 13+2 phase power design that has full control over all elements of power delivery to the CPU, like the Vcore and Vsa voltages. This means smoother and more stable power for the CPU, which should translate into higher and stabler overlocks. An additional 4-pin ATX 12V power connector is also present to deliver even more power for extreme overlocks.

One unique feature is the inclusion of a dedicated U.2 port located beside the eight SATA 6Gbps ports, which means there is no need to go through the hassle of getting an M.2-to-U.2 adapter if you want to install a 2.5-inch form factor PCIe 3.0 x4 drive.

There is also just a single M.2 socket onboard, which may seem a bit wanting compared to what other manufacturers are offering. However, it's possible that ASUS

is trying to avoid a situation where the M.2 drives end up overheating beneath a crowded multi-GPU array. This would also explain why ASUS has located the M.2 socket toward the outer edges of the board, where it is less likely to be affected by heat from the graphics cards.

A bundled 3x3 Wi-Fi module adds support for 802.11ac Wi-Fi and Bluetooth 4.0, allowing you to take advantage of the latest AC1900-class routers as well.

The onboard SupremeFX 2015 audio has also been upgraded over last year's solution. ASUS has added a total of four new discrete components – an onboard DAC, a dedicated clock, a TI RC4580 op-amp, and a de-pop relay – to provide better performance for live streaming applications and high-impedance headphones. In sum, this means a cleaner audio signal that is free from jitter, the ability to drive

headphones up to 600ohm, and the elimination of loud popping noises when you plug in your audio components.

Rounding out the package is a special area called the OC Zone that hosts a selection of buttons, switches, and voltage readout points to make overclocking easier. For instance, the ReTry button addresses the issue of lockups during POST by setting the system to continually attempt to reboot until it succeeds.



**Very capable  
overclocker.**



**Fairly expensive.**



### AT A GLANCE

#### Memory

4 DDR4 DIMMs up to  
DDR4 3866

#### Expansion

4x PCIe 3.0 x16  
2x PCIe 3.0 x1

#### USB 3.0

4x rear; 4x front

#### SATA

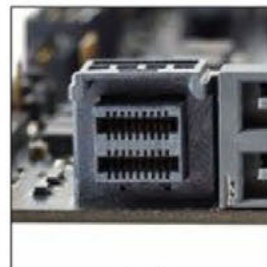
8 SATA 6Gbps

#### Price

\$809



The additional 4-pin header provides extra power to extreme overclockers.



The dedicated U.2 port enables you to easily install 2.5-inch PCIe 3.0 x4 SSDs.



The bundled OC Panel II lets you minimize the load on your system's resources by hooking up directly with your hardware.



## GIGABYTE Z170X GAMING G1

Overclocking comprises the cornerstone of performance for any enthusiast-level board, and the E-ATX Z170X Gaming G1 incorporates a whopping 22-phase digital power delivery design to help with overclocking stability. This includes a combination of IR digital power controllers and PowIRstage ICs to detect the current more accurately. According to Gigabyte, this will help to distribute the thermal load more evenly among the individual ICs, which will in turn improve reliability.

The VRM heatsinks themselves are equipped with built-in G1/4 threaded fittings that will work with the majority of water-cooling components.

Gigabyte has gone all out in every aspect of the board's features. All four PCIe 3.0 x16 slots are reinforced with metal, and there are a further two PCIe 2.0 x1 slots.

But what really helps the board distinguish itself from the pack is its use of a PLX PEX8747 PCIe lane switcher, which allows Gigabyte to direct the PCIe lanes however it wants to the slots and run four-way graphics setups (including four-way NVIDIA SLI) in x8/x8/x8 mode.

The onboard audio solution is a similarly extravagant affair. The Gaming G1 uses a dedicated quad-core Creative Sound Core3D audio processor and features a Burr-Brown 127dB DAC that supports 192kHz/24-bit

audio and upgradeable op-amps. The entire configuration is Creative Sound Blaster ZxRI-certified, and you should get good audio quality even if you plug your headphones into the front panel.

Gigabyte's flagship also has the most comprehensive networking solution out of all the boards. The dual Gigabit Ethernet ports rely on the latest Killer E2400, albeit without support for teaming. But together

with the Killer Wireless-AC 1535 network adapter, they do support the Killer DoubleShot-X3 Pro technology, an intelligent control system that optimizes your network connection for the lowest latency by prioritizing network traffic and sending the highest-priority packages over the fastest interface.

Like the other boards reviewed here, the Gigabyte board likewise has a selection of onboard buttons and switches to allow enthusiasts to tweak their systems more

easily. The OC button automatically loads an optimized configuration for your hardware, providing a one-click boost to performance. On the other hand, the ECO button saves power by reducing the overall power consumption according to the current system load.

For the proverbial icing on the cake, Gigabyte has thrown in a USB 3.1 front panel with Type-A and Type-C ports. After all, one can never have too many USB 3.1 ports.

**+**  
**PCIe lane switcher allows it to support up to four-way NVIDIA SLI.**

**-**  
**Lackluster overclocking performance.**



### AT A GLANCE

#### Memory

4 DDR4 DIMMs up to DDR4 3866

#### Expansion

4x PCIe 3.0 x16  
3x PCIe 2.0 x1

#### USB 3.0

7x rear; 4x front

#### SATA

10 SATA 6Gbps

#### Price

\$939



BIOS switches at the bottom let you switch between the default and backup BIOS.



The upgradeable op-amps can be seen flanking the third PCIe 3.0 x16 slot.



The VRM heatsinks feature G1/4 threaded ports for compatibility with most water-cooling components.



## MSI Z170A GAMING M9 ACK

The MSI Z170A Gaming M9 ACK sits at the top of MSI's enthusiast-oriented Gaming series of boards. However, a closer look at its feature set shows that it is a board that is geared more toward the gaming crowd as opposed to overclockers.

It features an 11-phase power design – that may seem paltry in comparison with the other boards, but it is the quality and implementation that matters more than the number of power phases. And like the Gigabyte Z170X Gaming G1, the MSI board also has G1/4 threaded fittings built into its VRM heatsinks should you choose to go the water-cooling route.

We also appreciate MSI's inclusion of a full-length motherboard backplate. It provides some reassuring heft and support to the board and even houses LEDs on the underside, so the board will give you a subtle red underglow when installed in your case.

Another noteworthy feature is something MSI calls DDR4 Boost, which is highlighted by the bright red memory traces on the PCB. By fully isolating the memory circuitry from the other components, DDR4 Boost ensures that the memory signal remains free from interference in order to achieve the best possible performance and stability.

The Gaming M9 ACK has just three PCIe 3.0 x16 slots, making it the only board in

our shootout to not have four slots. It's not going to make much of a practical difference to most users, but you could argue that as a flagship board, it should have included a fourth slot anyway. However, it makes up for it by reinforcing the first and third slots with metal, so heavy cards should hold up better in the long term.

In addition, the Xtreme Audio DAC audio solution has been upgraded with components

like a Sabre HiFi ESS 9016K2M DAC, and the board now supports high-resolution audio playback at 384kHz/32-bit thanks to the C-Media CM6632A HD audio processor. Nahimic Audio Enhancer technology is supported as well, offering audio enhancements like virtual surround, frequency and voice levellers, and tweaks for voice clarity for clearer in-game communication.

However, overclockers will be more interested in the Game Boost knob that lets you overclock the CPU quickly by just ratcheting up the knob. It does this by tweaking the CPU BCLK, which means you cannot do this on-the-fly and will have to reboot the system before the change can take effect. Still, it's a convenient way to get a free performance boost for your CPU, although you probably are not going to be able to achieve the maximum 5.0GHz setting without water-cooling.



**Unique DDR4 Boost feature for isolating memory signals.**



**No dual BIOS.**



### AT A GLANCE

#### Memory

4 DDR4 DIMMs up to DDR4 3600

#### Expansion

3x PCIe 3.0 x16  
3x PCIe 3.0 x1

#### USB 3.0

2x rear; 4x front

#### SATA

6 SATA 6Gbps

#### Price

\$669



The memory circuit has been isolated to keep the signal free from interference.



The Game Boost knob lets you overclock your CPU by tweaking the BCLK values.



The Killer Wireless 1535 Wi-Fi module can be detached from the board, depending on your needs.

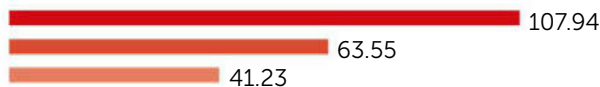
## Middle-earth: Shadow of Mordor

(average fps, higher is better)

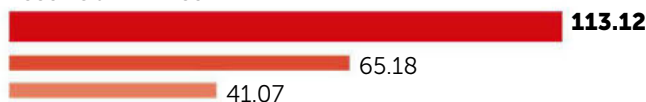
We tested the boards on Middle-earth: Shadow of Mordor to see how they stack up against each other in terms of real-world gaming performance. As expected, the performance difference between the boards was minuscule, given that the underlying CPU and GPU hardware was the same. Nevertheless, the ASUS board just managed to edge ahead, followed by the MSI and ASRock boards.

- 1,920 x 1,200
- 2,880 x 1,800
- 3,840 x 2,400

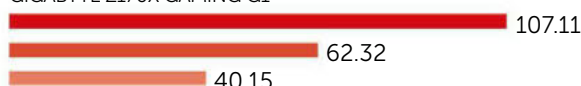
### ASROCK Z170 OC FORMULA



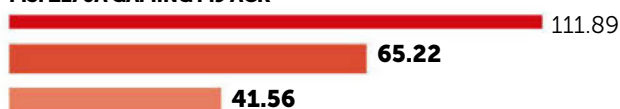
### ASUS ROG MAXIMUS VIII EXTREME



### GIGABYTE Z170X GAMING G1



### MSI Z170A GAMING M9 ACK



## SYSmark 2014

(SYSmarks, higher is better)

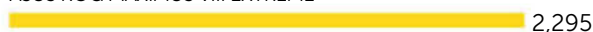
SYSmark is a general productivity benchmark suite that measures the response times of tasks on a PC using real-world applications like Microsoft Office 2013 and Adobe Photoshop and simulated user input. Task response times are used to generate a performance rating that reflects actual experience, so the faster a PC responds to application workloads, the higher its score.

The ASRock board came out on top here, followed by the ASUS and MSI boards respectively. The former did especially well in the Data/Financial Analysis test, which was what helped it clinch first place.

### ASROCK Z170 OC FORMULA



### ASUS ROG MAXIMUS VIII EXTREME



### GIGABYTE Z170 GAMING G1



### MSI Z170A GAMING M9 ACK



## Overclocking

(higher is better)

We first tweaked the CPU multiplier ratio and raised the voltage accordingly. After ascertaining that the achieved clock speed was stable, we then proceeded to increase the BCLK value to get smaller overclock increments. This also enabled us to take advantage of the new overclocking capabilities of Skylake CPUs, which allow a wider range of BCLK values. Changing the BCLK values also overclocks the RAM, so we throttled the speed accordingly to maintain system stability.

The ASUS motherboard was the most capable overclocker here and we managed to hit a top speed of 4.83GHz, which translated to around a 17% improvement over default speeds. The ASRock and MSI motherboard also performed decently, coming in second and third respectively. Unfortunately, the Gigabyte motherboard didn't live up to its whopping 22-phase power design at all, managing a top overclock of just 4.66GHz from our trials.

### ASROCK Z170 OC FORMULA



### ASUS ROG MAXIMUS VIII EXTREME



### GIGABYTE Z170 GAMING G1



### MSI Z170A GAMING M9 ACK





MODEL	ASROCK Z170 OC FORMULA	ASUS ROG MAXIMUS VIII EXTREME	GIGABYTE Z170X GAMING G1	MSI Z170A GAMING M9 ACK
MEMORY	4 DDR4 DIMMs (supports DDR4 4500+, max: 64GB)	4 DDR4 DIMMs (supports DDR4 3866, max: 64GB)	4 DDR4 DIMMs (supports DDR4 3866, max: 64GB)	4 DDR4 DIMMs (supports DDR4 3600, max: 64GB)
STORAGE	Intel Z170 chipset: 6x SATA 6Gbps; 3x SATA Express; 3x M.2 socket ASMedia ASM1061: 4x SATA 6Gbps	Intel Z170 chipset: 6x SATA 6Gbps; 2x SATA Express; 1x M.2 socket ASMedia ASM1061: 2x SATA 6Gbps	Intel Z170 chipset: 6x SATA 6Gbps; 3x SATA Express; 2x M.2 socket ASMedia ASM1061: 2x SATA 6Gbps; 1x SATA Express	Intel Z170 chipset: 6x SATA 6Gbps; 2x SATA Express; 2x M.2 socket
AUDIO	Realtek ALC1150 audio codec, with support for Purity Sound 3	ROG SupremeFX 2015 8-channel	Quad-core Creative Sound Core3D processor with 1x TI Burr Brown OPA2134, 2x JRC NJM2114 op-amps	Xtreme Audio DAC with C-Media CM6632 audio codec
NETWORKING	1x Intel I219-V	1x Intel I219-V; 3x3 dual-band Wi-Fi 802.11ac module	2x Killer E2400; 2x2 Killer Wireless-AC 1535	1x Killer E2400; 2x2 Killer Wireless-AC 1535
REAR I/O	1x PS/2; 1x HDMI; 1x DisplayPort; 2x USB 2.0; 1x USB 3.1 (1 Type-A, 1 Type-C); 4x USB 3.0; 1x RJ-45; 1x Optical S/PDIF Out; 1x Clear CMOS button; 6x audio	1x PS/2; 1x HDMI; 1x DisplayPort; 4x USB 3.1 (3 Type-A, 1 Type-C); 4x USB 3.0; 1x RJ-45; 1x ASUS Wi-Fi GO! Module; 1x Optical S/PDIF Out; USB BIOS Flashback button; 5x audio	1x PS/2; 1x HDMI; 2x USB 2.0; 2x USB 3.1 (1 Type-A, 1 Type-C); 7x USB 3.0; 2x RJ-45; 1x Optical S/PDIF Out; 5x audio	1x PS/2; 1x HDMI; 1x DisplayPort; 3x USB 2.0; 2x USB 3.1 (1 Type-A, 1 Type-C); 2x USB 3.0; 1x RJ-45; 1x Optical S/PDIF Out; 1x Clear CMOS button; 5x audio
EXPANSION SLOTS	4x PCIe 3.0 x16; 1x PCIe 3.0 x1; 1x PCIe 2.0 x1; 1x half-size mini-PCIe	4x PCIe 3.0 x16; 2x PCIe 3.0 x1	4x PCIe 3.0 x16; 3x PCIe 2.0 x1	3x PCIe 3.0 x16; 3x PCIe 3.0 x1
PRICE	\$540	\$809	\$939	\$669



# AND THE BEST Z170 MOTHERBOARD IS



## ASUS ROG MAXIMUS VIII EXTREME

At the end of the day, it was the ASUS Maximus VIII Extreme that impressed us the most. It topped the majority of our test benchmarks, and was always among the top two performers for the tests it didn't win. Furthermore, its blend of gaming- and enthusiast-oriented features is quite compelling, as it manages to appeal quite successfully to both crowds, setting it apart from the other boards that often look like they are sacrificing one for the other.

In addition to being the best board for overclocking, it also offers a range of hardware buttons – the ReTry button for instance – that speak to ASUS' efforts to make the overclocking process as smooth as possible. It is this attention to detail and user experience, combined with its stellar performance and attractive design, that lead us to unreservedly declare it the winner. It will also cost you a pretty penny at S\$809, but what you get is an exceedingly feature-rich board that performs great and looks the part as well.

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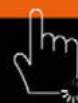
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# THE BEST FLAGSHIP SMARTPHONE CAMERA

Which smartphone flagship from 2015 (and continuing into 2016) has the best camera? We've rounded up the usual suspects to pit their cameras against each other.

Text by *Alvin Soon*

Photography by *Zaphs Zhang + Darren Chang*

Art Direction by *Ken Koh + Ian Chong*







vs  
APPLE IPHONE 6S PLUS  
•  
HUAWEI NEXUS 6P  
•  
LG V10  
•  
SAMSUNG GALAXY NOTE 5  
•  
SONY XPERIA Z5 PREMIUM

## APPLE IPHONE 6S PLUS

The iPhone 6s Plus has the best camera UI for most people. It's easy to use, makes sense, is fast and its auto-focus is spot on most of the time. You can control exposure easily by tapping the screen for focus, and sliding the brightness slider that appears; though that slider is a bit of a small target. You don't need to go into any secondary menus to do things like shoot panoramas

and slow-mo.

But the iPhone 6s Plus pays for that simplicity at the expense of sophistication. There are no advanced controls, and even third-party apps can't do much with the iPhone 6s Plus' camera except control the shutter speed. Settings for video resolution are hidden away in the iPhone's Settings app, which I doubt most people would go into.



### AT A GLANCE

#### Megapixels

12MP

#### Sensor Size

1/3"

#### Focal Length

29mm

#### Aperture

f/2.2

#### O.I.S.

Yes



**Has the best camera UI for most people.**



**There are no advanced controls.**

## HUAWEI NEXUS 6P

The Huawei Nexus 6P's camera UI is as bare bones as you can get. While you can tap to focus, you can't change brightness levels. It does have one clever detail, when the camera is shooting at slower shutter speeds, a circular animation cues you to hold the camera steady until the shot is finished.

The 6P's camera can slow down if you take multiple shots, but other than that, there's really nothing much to say about it. If you get the Nexus 6P, our first recommendation would be to download a third-party camera app to get more features for shooting and editing.



### AT A GLANCE

#### Megapixels

12.3MP

#### Sensor Size

1/2.3"

#### Focal Length

26mm

#### Aperture

f/2.0

#### O.I.S.

N.A



**It works.**



**The app is as bare as you can get. Download a third-party camera app immediately.**

## LG V10

While fast, the LG V10's autofocus tends to hunt even after acquiring focus. While the V10 lets you tap to focus in both the 'Simple' and 'Auto' modes, it omits the crucial ability to adjust brightness settings. You'll have to be in 'Manual' mode to do that.

Both the LG V10 and the Samsung Galaxy Note 5 open up advanced camera controls to the user. However, the V10's Manual mode

is fully manual, which is more difficult to use. You can't set Auto ISO in Manual, so when you change shutter speed, you'll also need to shift ISO to compensate, and vice versa.

That's too bad, because otherwise the V10's manual UI is actually better than the Note 5's in all ways. The V10 also has the most advanced manual video mode among all the five smartphones.



### AT A GLANCE

**Megapixels**

16MP

**Sensor Size**

1/2.6"

**Focal Length**

28mm

**Aperture**

f/1.8

**O.I.S.**

Yes



**Best manual UI for video and (almost) stills.**



**No Auto ISO feature in Manual mode.**

## SAMSUNG GALAXY NOTE 5

The Samsung Galaxy Note 5 has the user-friendliest UI for both basic and advanced shooting. In 'Auto' mode, I like how the Samsung Galaxy Note 5 lets you easily change exposure levels, with an exposure slider which appears to the side of the screen when you tap to focus.

While both the LG V10 and the Note 5's camera apps come with advanced controls, the Note 5 does it better in one critical

way. In 'Manual' mode, you can enable Auto ISO, which lets you fully focus on adjusting shutter speed. If not for this one critical missing option, the LG V10 actually has a better UI for shooting stills and videos manually. What the Note 5 lacks is a way to quickly reset all manual settings, and a fast way to save in raw (you have to go into the camera app's settings to enable it).



### AT A GLANCE

**Megapixels**

16MP

**Sensor Size**

1/2.6"

**Focal Length**

28mm

**Aperture**

f/1.9

**O.I.S.**

Yes



**User-friendliest UI for both basic and advanced shooting.**



**No quick settings reset in Manual mode. No quick way to save in raw.**



## SONY XPERIA Z5 PREMIUM

The Sony Xperia Z5 Premium's camera UI is sparse. If you shoot in 'Superior Auto' mode, you can tap to focus, but you can't change brightness settings. There's a 'Manual' mode, but this only lets you change white balance and exposure.

On the other camera apps, you can set the video resolution to 4K as default, but you can't do that on the Z5. Instead, you'll need to go into its 'Modes' screen, and tap '4K' video every time you want to take 4K video, which is an inexplicable hassle.



### AT A GLANCE

**Megapixels**  
12MP

**Sensor Size**  
1/2.3"

**Focal Length**  
24mm

**Aperture**  
f/2.0

**O.I.S.**  
N.A



**It works.**



**The camera UI is sparse, and it's impossible to set 4K video as the default.**

## SMARTPHONE CAMERAS ARE GREAT, BUT...

I love my smartphone's camera. I've loved it ever since I got one, years ago, and it's helped me capture years of random memories that would have otherwise been lost. Snapshots of my life when I didn't have a 'proper' camera with me. Those little moments when unexpected, happy things happened, when I never expected them.

And I love how today's smartphone cameras are so much better than they used to be. From more megapixels to optical image stabilization to 4K video. Wow. Good times.

But, the truth is, they're still not great, when compared with a modern digital camera with a large sensor. These 'proper' cameras produce image quality that still runs circles around what smartphones can do.

It breaks my heart when I see people using their smartphones to take photos of 'important' events, like a big family dinner or an overseas vacation. It's judgmental I know. But speaking from personal experience, I have hundreds of grainy, dark, low-resolution smartphone camera photos where I wish I'd brought my camera and used that instead.

**The saying, "The best camera is the one that's with you," is so true. But I think we can do better for the important moments in our lives. I think we can expand that to, "The best camera is the one that you bring."**

'Important' events beg for 'proper' cameras, if only because these moments are captured in better quality to keep through the years. If you treasure these moments as much as I do, and you love photographs, then my advice is to get a 'proper' camera of your own.



## IMAGE QUALITY & PERFORMANCE - APPLE IPHONE 6S PLUS

The Apple iPhone 6s Plus' colors are quite pleasing in good light, however, its white balance tends to veer warmer, with some images looking more yellow than usual. The lens is mostly sharp, with the right upper and lower corners slightly soft. There is no barrel distortion. When viewed up close, the images lack fine detail, especially when compared against the Samsung Galaxy Note 5.

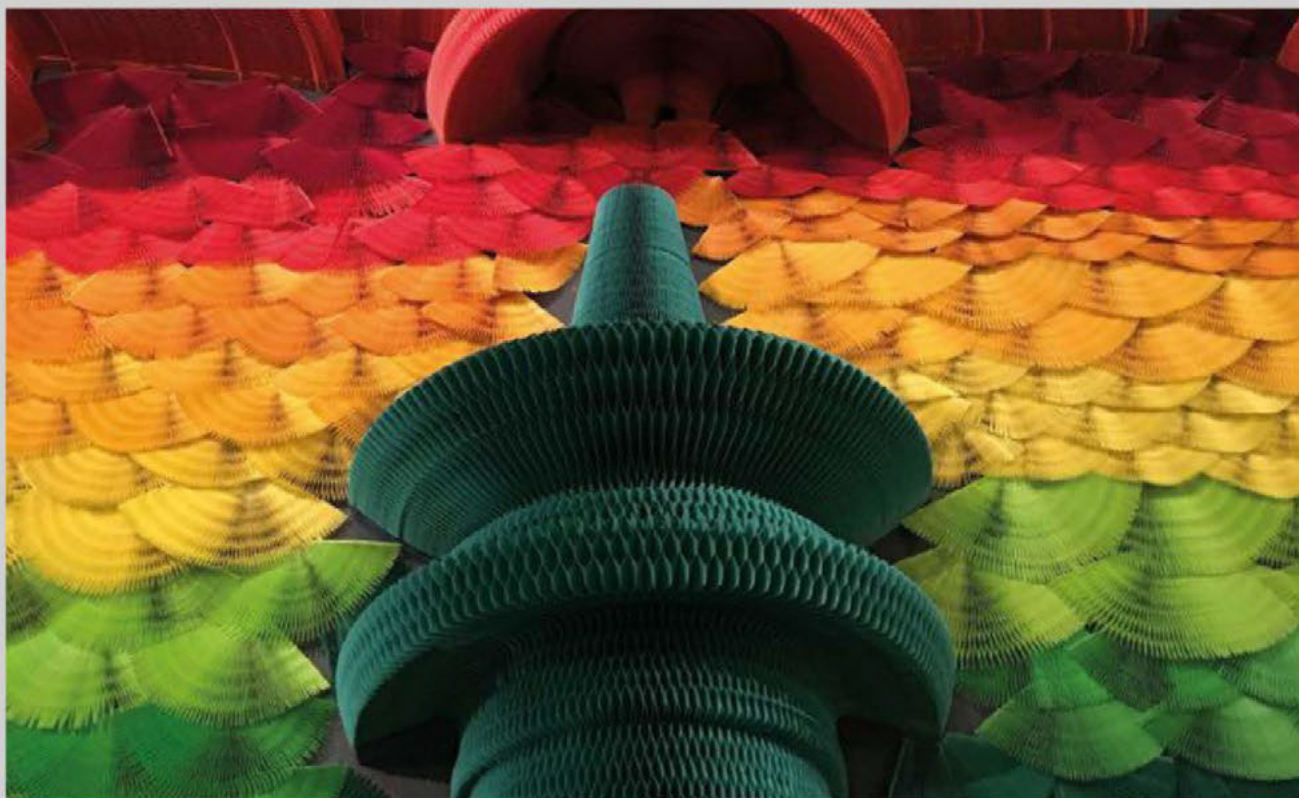
The iPhone 6s Plus does manage to preserve whatever details it captures while shooting in low light. That would be a given since its images are shot at low ISOs, even in dark situations. To get such low ISO settings, the iPhone 6s Plus has an alarming habit of shooting at dangerously low shutter speeds. And yet, the images are still stable and sharp, which I chalk up to its excellent optical image stabilization. Even at the higher setting of ISO 640, the iPhone 6s Plus strikes a good balance between noise reduction and detail retention.

HDR images tend to be underexposed, but the iPhone 6s Plus consistently gets the best panoramas out of all five smartphones.

The iPhone 6s Plus's 4K videos are fine in good light, has some noise in low light, and has hardly any rolling shutter. Its optical image stabilization is surprisingly good, the difference is obvious when you compare it against the non-stabilized shot taken by Huawei's Nexus 6P. This makes it the best 4K video camera, out of all the five flagships.



The iPhone 6s Plus' colors are quite pleasing, but the images lack fine detail.



The iPhone 6s Plus manages to nail sharp and steady shots in low light, thanks to its excellent optical image stabilization.



**IMAGE QUALITY & PERFORMANCE - HUAWEI NEXUS 6P**

Huawei's Nexus 6P reproduces colors well in good light. The lens is sharp from corner to corner, and there's very slight barrel distortion. Slight crosshatching can be seen on our resolution chart, and while it's not as apparent as on the Sony Xperia Z5, it still results in some jitteriness on subject edges.

Huawei's Nexus 6P has decent performance in low light. There's more of the jittery noise that plagues the Sony Z5, but it manages to balance overall image noise with detail retention quite well.

The Nexus 6P has the distinction of shooting the best HDR images, with a good amount of detail in both the brightest and darkest parts of the image. Its panoramas don't fare as well; they suffer from odd skewing.

The Huawei Nexus 6P's 4K videos do fine in good light, but there's a lot of noise in low light. There is some rolling shutter. The lack of optical image stabilization really hurts it, once you see how smooth videos can look with good OIS, you realize how dizzy non-stabilized video can look.



The Nexus 6P does well in good light, with pleasant colors and good details.



Low-light performance is decent, it manages to balance overall image noise with detail retention quite well.



## IMAGE QUALITY & PERFORMANCE - LG V10

The LG V10's colors are consistently subdued. There's a lack of saturation, which make photos look flat. The odd thing is its zeroed DNG (raw) files appear more vibrant than its JPEGs. If you increase saturation in post, the V10 actually shoots good images in good light, with fine detail. The lens is sharp from corner to corner, with only slight barrel distortion.

Image details tend to smear in low light, and there tends to be chroma noise in the shadows, especially in the raw DNG files. The LG V10 does excellent HDR images, with lots of detail captured across the frame. However, ghosting can appear when shooting moving subjects. The LG V10's panorama's seams can be oddly joined together, with some softness or different exposure levels between captured images.

LG's V10's 4K videos look fine in good light, but videos in low light are noisy. The autofocus tends to hunt, which means you'll see a jerking in and out effect as the camera tries to lock focus. Optical image stabilization isn't available for 4K video, but on Full-HD resolution it's not as smooth as on the iPhone 6s Plus. Rolling shutter is obvious when moving the camera.



The LG V10's colors are consistently subdued, with a lack of saturation.

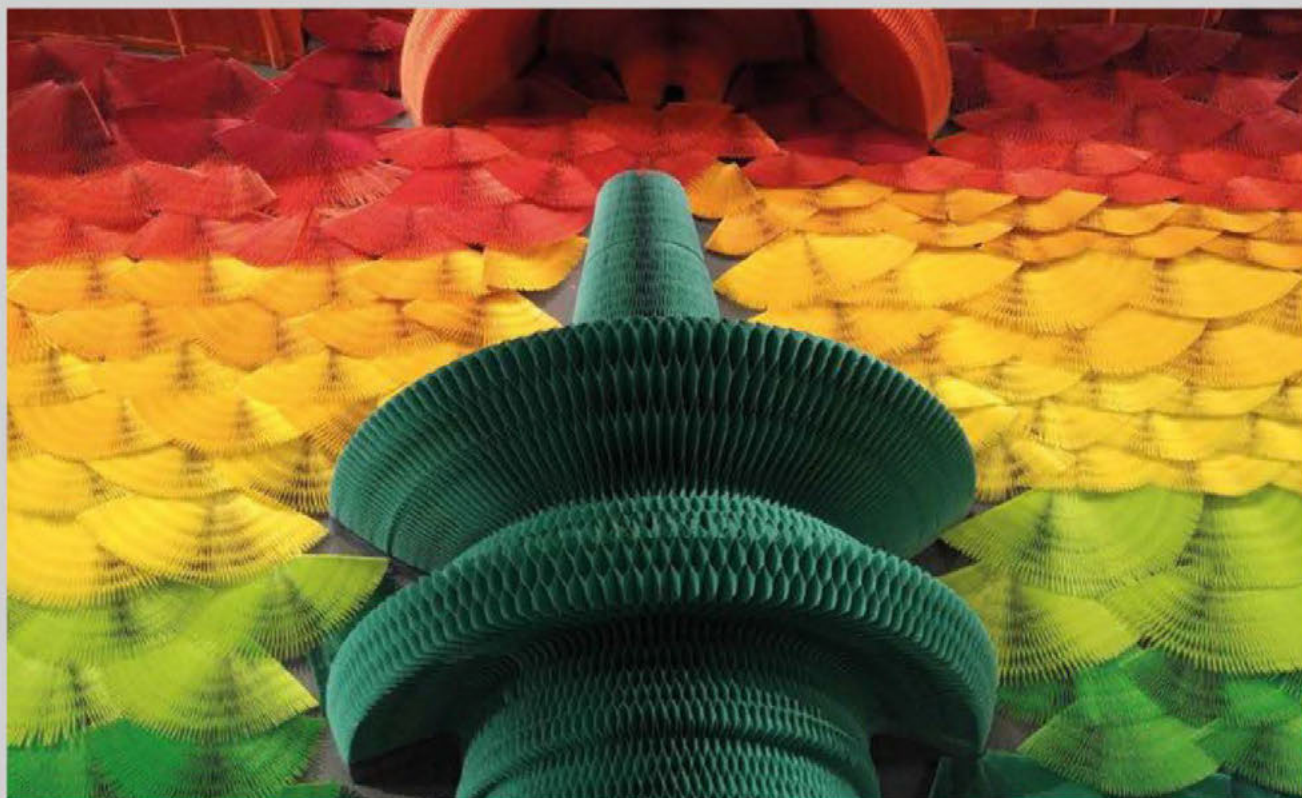


Image details tend to smear in low light, with apparent color noise in the shadows.



## IMAGE QUALITY & PERFORMANCE - SAMSUNG GALAXY NOTE 5

The Samsung Galaxy Note 5 manages the best balance between pleasing color and detail capture in good light. The lens is mostly sharp, with some softness in the left upper and lower corners. There is hardly any barrel distortion.

But the Note 5 suffers from heavy-handed noise reduction in low light, which smooth out details, giving subjects an overly smooth and muddy appearance.

The Note 5 does well with HDR, and there's no ghosting to be seen. While the Note 5's HDR seems to render more even tones, the Nexus 6P retains highlights better. The Samsung Galaxy Note 5's panoramas have some odd seams, and it has problems achieving an even, overall exposure.

The Note 5's 4K videos are fine in both good and low light, and its optical image stabilization does quite well, neck to neck with the iPhone 6S Plus. The problem is that OIS isn't available at the highest 4K resolution, it only works at Full-HD resolution and below. Besides that, the Note 5 has one major weakness; rolling shutter is quite obvious when you move the camera.



The Note 5 performs best in good light, with vibrant colors and rich details.



The Note 5 tends to be overly aggressive with noise reduction in low light, resulting in lost details.



## IMAGE QUALITY & PERFORMANCE - SONY XPERIA Z5 PREMIUM

The Sony Xperia Z5 Premium does well with accurate and pleasing color reproduction. It also has the best Auto White Balance among the five smartphones, while the others tend to grade their images a bit warmly, the Z5 Premium usually gets the light looking the way it did in real light. There is slight barrel distortion, and the left upper corner of the image is soft.

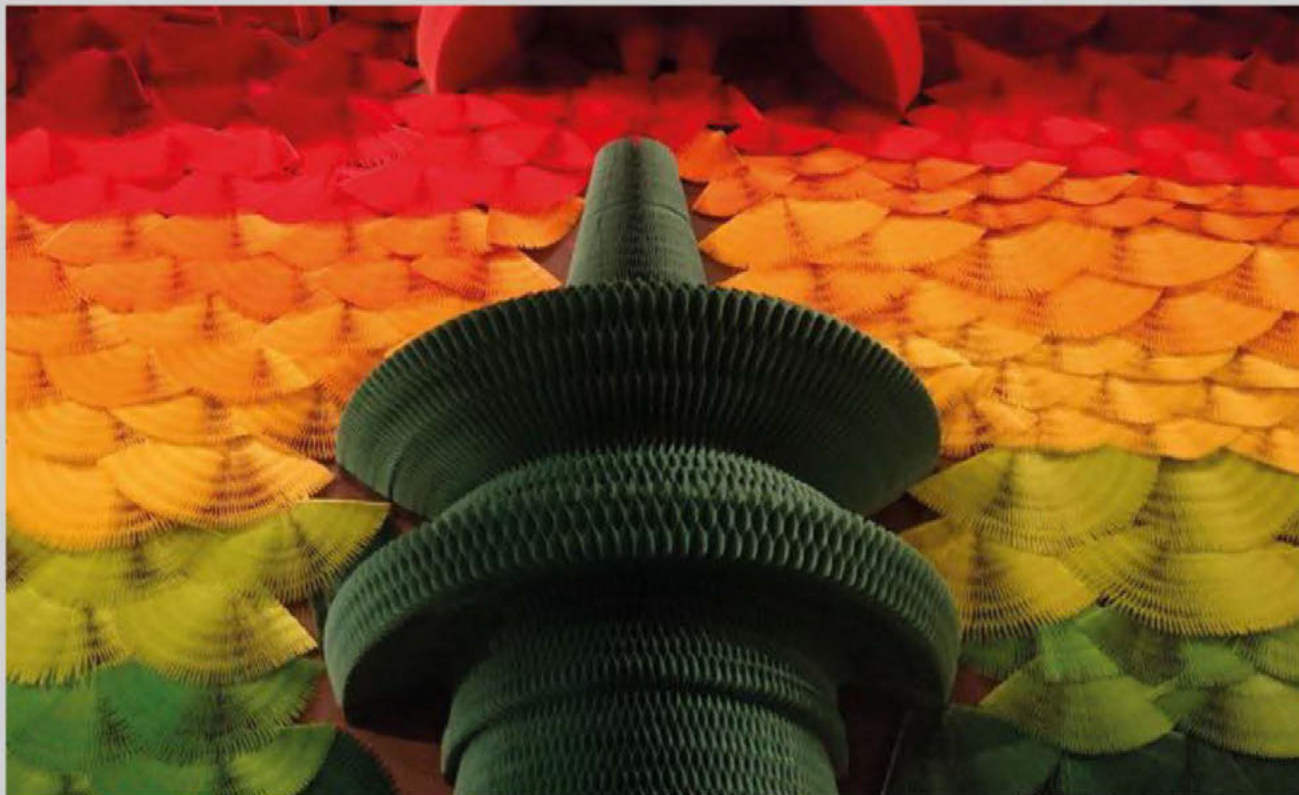
The Z5 Premium's highest 22MP count should give us the most detailed images, but the odd crosshatching artifacts that plagued the Z1 still lives on in the Z5, albeit in a reduced fashion. The result is that subject edges tend to take on a 'jittery' look; when viewing the whole photograph, the jitteriness in the details make the image look noisy and inorganic.

The Sony Xperia Z5 Premium's HDR mode doesn't capture as wide a range of detail as the rest of the cameras, especially in the highlights. The Sony Xperia Z5 Premium's panoramas are terrible for one vital reason: It doesn't save panoramas in high-resolution like the other smartphones, but compresses them into low quality 3MP images instead.

The Xperia Z5 Premium's saving grace is its video camera, which actually does quite well. Rolling shutter is kept to a minimum, and there's little noise in low light. Even though it lacks optical image stabilization, its digital image stabilization works to smooth the shot.



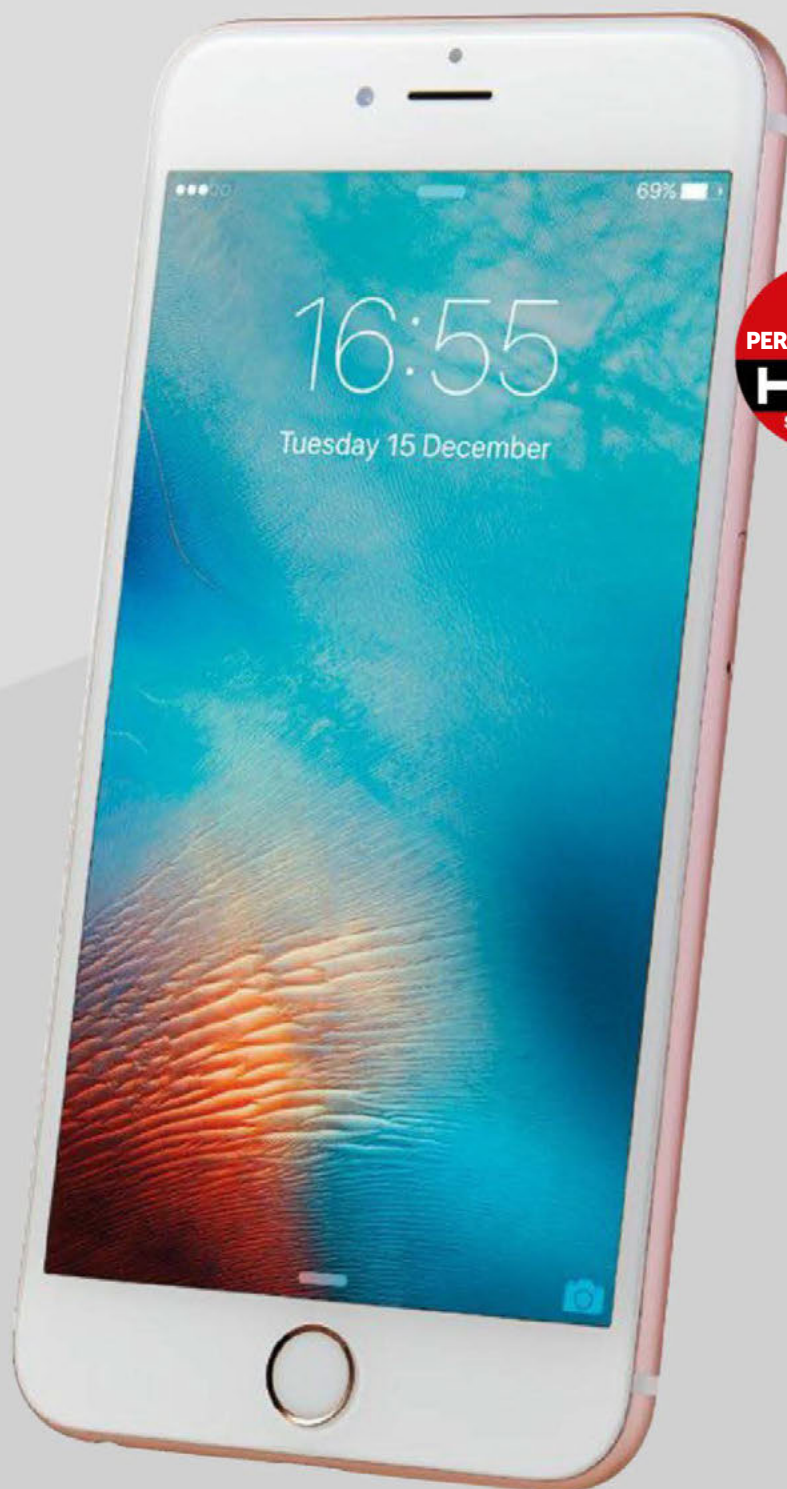
The Z5 Premium delivers the best white balance, but it suffers from artificial-looking image noise, even in good light.



The crosshatching artifacts are more apparent in low light, and it gives subject edges a harsh, artificial look.



# THE BEST SMARTPHONE SHOOTER IS



## APPLE IPHONE 6S PLUS

The Apple iPhone 6s Plus is our best smartphone camera. Its optical image stabilization is best of class, giving you steady photos even in low light and smooth video that doesn't make viewers dizzy. It also shoots the best panoramas out of the lot. Samsung's Galaxy Note 5 comes a very close second, with better image detail in good light, but it doesn't do as well in low-light, panoramas and video.

The iPhone 6s Plus isn't perfect. When looked at closely, the iPhone 6s Plus' images lack fine detail, especially when compared to the Galaxy Note 5. Still, its overall strengths and lack of critical weaknesses shared by its competitors, confer the iPhone 6s Plus first place in our shootout — even if it's not by a wide margin.

# CURVY GAMING GOODNESS

## Acer Predator X34

Curved displays aren't new anymore, but the Acer Predator X34 was the first curved G-Sync monitor that hardcore gamers could buy. As a gaming monitor, it has very high specifications. To begin, it has a curved 34-inch IPS display and supports a resolution of 3,440 x 1,440 pixels. Response time is rated at 4ms, which is great for an IPS monitor; and refresh rates can go up to as high as 100Hz. Plus, it supports NVIDIA's G-Sync technology, which aligns the refresh rate of the monitor to the draw rate of the GPU to reduce the effects of tearing, lag and stutter.

The Predator X34 even has the design down pat. The highly angular stand looks menacing and it adjusts for

height and tilt, though is not rotatable. Behind the display are ambient lights that can be adjusted to suit your mood. The Predator X34 also has a built-in 4-port USB 3.0 hub, which can be used to connect to keyboards, gaming mice or to change your mobile devices.

IPS monitors have reached very high standards these days, and the Predator X34 works very well out of the box. Colors are vivid and vibrant; brightness uniformity (an issue on larger displays) is not really a problem too. The edges can seem less bright - but only if you really stop to notice.

Its high refresh rates mean games play smoothly and fluidly. G-Sync is a valuable tool as well, especially if you are achieving high frame rates

and having problems with tearing. It can help reduce lag and stutter too if you are playing a more demanding game and experiencing wildly varying frame rates.

Gaming aside, the Predator X34 excels in regular use and productivity tasks too. Its ultra-wide resolution allows up to three sizable windows side by side. Users who do a lot of work with spreadsheets will be happy to know that up to 52 columns can be displayed quite comfortably.

Still, curved monitors are not priced cheaply and at \$1,699, the Predator X34 is clearly a high-end product. But if the price tag doesn't put you off, what you will have is a very capable monitor that can excel at both gaming and productivity.

by *Kenny Yeo*

### AT A GLANCE

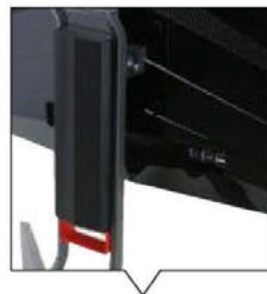
**Display size**  
Curved 34-inch

**Screen resolution**  
3,440 x 1,440 pixels

**Refresh rate**  
Up to 100Hz

**Response time**  
4ms

**Price**  
\$1,699



The stand adjusts for height and tilt, and behind the monitor are four USB 3.0 ports.

### CONCLUSION

**It might be pricey, but the Predator X34 is great for both gaming and both.**

TESTED & RATED

**8.5**<sub>/10</sub>

**HWM**  
SINGAPORE



## AT A GLANCE

**Display**

8-inch 2,048 x 1,536 pixels Super AMOLED

**Processor**

Exynos 5433 (1.9GHz A57 quad-core + 1.3GHz A53 quad-core)

**Weight**

272g

**Dimensions**

198.6 x 134.8 x 5.6mm

**Price**

\$698 (32GB)



The Galaxy Tab S2 8.0 is just 5.6mm thick, thinner than even the Apple iPad Mini 4.

## CONCLUSION

**An iterative upgrade over the Tab S, the Tab S2 8.0 is good, but misses out on some opportunities to help it stand out.**

TESTED &amp; RATED

# 8.0<sub>/10</sub>

**HWM**  
SINGAPORE



TAP FOR  
GALLERY



# THINNER AND FASTER

## Samsung Galaxy Tab S2 8.0

The Galaxy Tab S2 is Samsung's newest flagship tablet for personal media consumption, but at a time where the growing legions of phablets and 2-in-1 hybrids are vying for the tablet's niche, you can say it faces some stiff competition. Samsung's play for your wallet is a design that's thinner and lighter than ever.

Now, there are two sizes for the Tab S2 available: 9.7-inches and 8.0-inches. We'll be reviewing the smaller of the two. At just 5.6mm thick, the Tab S2 8.0 shaves a whole millimetre of its predecessor, the 6.6mm-thick Galaxy Tab S. It is even thinner than Apple's iPad Mini 4, which measures 6.1mm. The 8-inch slate also weighs just 272g, which means you can slip it into your bag and forget it's even there.

Its svelte design isn't without trade-offs though. Compared to the 4,900mAh battery on the 8.4-inch Galaxy Tab S, the Tab S2 features a smaller 4,000mAh juice pack. This means slightly poorer battery life, but still good against competition in its size range. The problem however, is the absence of any form of quick charging. We had to wait around four hours for it to fully recharge – an eternity when you've gotten used to fast-charging technology.

The strongest point of the Tab S2 is probably its display. Samsung's Super AMOLED panel is still as good as they come; colors are vibrant, punchy and bright. The best part is that Samsung has ditched the awkward 16:10 aspect ratio on the Tab S in favor of a more practical 4:3 screen. That means slightly

less pixels – 2,048 x 1,536 to be exact – but the Tab S2 now works much better with general productivity tasks.

Our review unit came with 32GB of internal storage, but those of you who are in the habit of storing your photo and video libraries on your tablet will appreciate the fact that the microSD slot supports up to 128GB of extra storage.

When it comes to the silicon powering the tablet, it's a bit disappointing to see it using the same Samsung Exynos 5433 octa-core processor as 2014's Galaxy Note 4 smartphone. While it is an upgrade over the Exynos 5420 in the Tab S, we would really have loved to see a more significant upgrade instead, such as the mighty Exynos 7420.

by Koh Wanzhi



#### AT A GLANCE

##### Keys

Full-size, 1.5mm travel

##### Interface

Smart Connector

##### Colors

Red gold, Space grey, Silver

##### Weight

725g

##### Price

\$249



Backlights make it easier for users to type in dimly light environments.

#### CONCLUSION

**The Create keyboard makes the iPad Pro heavy and cumbersome, but provides the best typing experience.**

TESTED & RATED

**8.0**<sub>/10</sub>

**HWM**  
SINGAPORE

# THE BEST TYPING EXPERIENCE FOR THE IPAD PRO

## Logitech Create

Apple is hoping that its new iPad Pro tablet will appeal to users who have traditionally worked on a notebook. To this end, Apple's own Smart Keyboard for the iPad Pro is a nifty little tool, but users have complained it's too thin to be used comfortably for extended periods, plus the lack of backlighting makes it unsuitable for darker environments. To solve these problems and more, you've got the new Logitech Create keyboard.

First things first, the Create keyboard is pretty heavy. Weighing 725g, it's almost as heavy as the iPad Pro itself. It's also

fairly thick at 19.9mm. With the iPad Pro attached, the combination weighs over 1.4kg – that's heavier than some Ultrabooks. It's also quite unwieldy. Everything about the frame and case is stiff, which makes tasks like attaching/detaching the iPad Pro from the case and even adjusting volume cumbersome.

Fortunately, the Create redeems itself in other ways. The keyboard attaches to the iPad Pro's smart connector magnetically using a bar above the keys itself. Along with the case, it allows the iPad Pro to be docked securely at an angle comfortable for typing.

And since the Logitech Create doesn't concern itself with thinness, the keyboard surface has been recreated to look and feel like that of a MacBook. The keys itself are full-sized with up to 1.5mm of travel, providing a typing experience significantly better compared to Apple's Smart Keyboard. It also has backlights with three levels of brightness, a boon for users who like to get work done on flights. Another cool thing is that it has an additional row of shortcut keys that can be used to quickly adjust settings, search the iPad, play or stop music, and more.

The Logitech Create keyboard for the iPad Pro is an excellent keyboard, but it does add significant heft to your device. If that doesn't bother you, then at \$249, it's even slightly more affordable than Apple's own Smart Keyboard and well worth your consideration if you type a lot on your iPad Pro.

by *Kenny Yeo*





# THE DEFINITION OF EXTRAVAGANCE

## ASUS ROG GX700

### AT A GLANCE

#### Processor

Intel Core i7-6820HK  
(2.7GHz, 8MB cache)

#### Display

17.3-inch  
1,920 x 1,080 pixels  
IPS (G-Sync capable)

#### Memory

64GB DDR4 RAM

#### Graphics

NVIDIA GeForce  
GTX 980

#### Storage

M.2 512GB (2x 256GB  
SSDs in RAID 0)

#### Price

\$6,198

We've come across over-the-top gaming laptops before – think full-fledged mechanical keyboards and dual NVIDIA GeForce GTX 980Ms in SLI – but the ASUS ROG GX700 is quite a different beast altogether. Not only is it the world's first liquid-cooled gaming notebook, it is also equipped with an overclockable mobile processor, a desktop-class NVIDIA GeForce GTX 980, a 512GB RAID 0 SSD setup, and a whopping 64GB of DDR4 RAM.

The liquid-cooling system is housed in a separate cooling dock, which means you get to enjoy both the relative mobility of an undocked notebook, and when you're

ready to get settled for some mad fragging, the extra performance that liquid-cooling will unlock. In addition, you get chilly temperatures and more overclocking headroom for both CPU and GPU, which equates to even more performance.

The 1,920 x 1,080-pixel 75Hz G-Sync display can seem a bit underwhelming in a time of 4K displays on compact ultrabooks, but it may actually be a good thing for a gaming notebook because you can be assured of running even more titles on it. Furthermore, G-Sync synchronizes the display's refresh rate with the frame rates the card is pushing, so you get an overall smoother gaming experience.

When undocked, the ROG GX700 serves up performance on the level of an NVIDIA GeForce GTX 980M. In our gaming benchmarks, it matched other tested GeForce GTX 980M-equipped notebooks, and even managed to best them in some areas. It's safe to say that the notebook is a solid performer even without the added boost from liquid-cooling dock. For instance, it turned out an average of 72.20fps in Middle-earth: Shadow of Mordor on Ultra at 1080p, so you should have almost no trouble running most modern titles.

Performance rocketed to proper GeForce GTX 980 levels when docked. The same Shadow of Mordor



The red connector delivers power while the two flanking pipes pump out the coolant.



There are dedicated Thunderbolt 3 and USB 3.1 Type-C ports.

#### CONCLUSION

**A premium notebook with a premium price tag, the ASUS ROG GX700 is for gamers who want the best possible notebook gaming experience.**

benchmark saw a 23% improvement on Ultra and a 38% boost on High. The liquid-cooling allows the desktop GPU to run at its full specifications, effectively removing the speed throttling in place when the notebook is undocked.

But the GPU isn't solely responsible for the performance boost though. Docking the notebook also automatically overlocks the CPU quite aggressively. The multiplier is increased to 40 for a maximum Turbo speed of 4.0GHz – a huge boost over the default 2.7GHz base frequency.

When it came to monitoring operating temperatures, it was the GPU that registered the largest drop (71°C vs 62°C). On the other hand, the CPU displayed a more modest drop from 91°C to 85°C when moving to the dock. The latter figure is actually still higher than the 80°C we noted on the Intel Core i7-6700K in the ROG G752, but the difference can probably be attributed to the higher overclocked speeds on the GX700.

ASUS has included all the ports and connectors that you would possibly need on this notebook. On the left are two USB 3.0 ports, a microphone jack, a headphone jack and an SD card reader. On the other side, there is another USB 3.0 port, an HDMI port, a mini-DisplayPort, a Thunderbolt 3 port and a separate USB 3.1 Type-C port. There's even space for a Gigabit Ethernet jack,

something serious players of multi-player online games will appreciate.

The backlit keyboard provides a generous 19mm of travel, which makes for a fairly pleasant and tactile typing experience. Five configurable macro keys are located in the top left, so you can bind custom functions to them. There's even a shortcut key to launch XSplit Gamecaster, an app for recording and streaming your gameplay. Clearly, ASUS is doing everything it can to please even the most demanding of gamers.

We were also impressed by how thin the notebook was. At just 38.5mm thick, it is much thinner than the less powerful ROG G752, which is a hefty 51mm thick. It weighs 3.6kg, almost a kilogram lighter than the 4.4kg ROG G752, so it is also slightly more mobile. Of course, lacklustre battery life is expected of a notebook of this size and class. The GX700 lasted over

two hours in our battery life tests, which consisted of a mix of real-world applications and usage scenarios in PCMark Home. The GX700 may be quite easy to cart around for a 17.3-inch laptop, but you're not going to be able to spend too long away from a power outlet.

With all that said and done, The GX700 is a premium, luxury product through and through. It's not likely something you'd go out and buy on a whim. Perhaps it's worth just stepping back and marvel at what ASUS has created.

by Koh Wanzi

TESTED & RATED

**8.5**<sub>/10</sub>

**HWM**  
SINGAPORE











FEATURE

# Inside Fujifilm

We were recently in Tokyo for Fujifilm's X-series cameras' 5th anniversary, with a visit to Fujifilm's factory in Taiwa, Japan. That's where production is completed for many of their products, including the latest XF100-400mm F4.5-5.6 R LM OIS WR lens. Here's an exclusive look inside Fujifilm.

Text & Photographs by *Marcus Wong*

**F**uji Photo Optical Company (Ltd) was founded in 1944, and built lenses for several companies, including Leica.

Two of the most notable lenses from this period include the Cristar 50mm F2 and the Cristar 35mm F3.5, and these were followed up in 1954 with a trio of fast lenses under Fujifilm's own label: Fujinon. Known as the "Fujinon Speed Trio," this included the 35mm F2, the 50mm F1.2, and the 100mm F2, all exceptionally fast and sharp lenses for the time.

Building on their expertise of building camera lenses, Fuji moved into making their own Fujifilm branded SLRs, later forgoing the 35mm segment to move into medium and large format cameras like the GX645 and the GF670.

Their film cameras have been used by the likes of photographers like Richard Avedon, Annie Leibovitz and Karl Lagerfeld, and now the company hopes the growing popularity of their X-series cameras will rise to the same point.

### ALL ABOUT LENS QUALITY

Other than the quality of their digital

X-Trans sensors, one thing that Fujifilm is banking on to bring them back to the forefront are their Fujinon lenses.

Designed and manufactured completely to Fujifilm's own specifications and design, lenses have always been a source of pride for Fujifilm. According to them, their Fujinon lenses are designed so they can resolve the full power of the APS-C sized X-Trans sensor, giving details that equal or surpass

what you can find on a typical full-frame DSLR setup.

But to ensure that all their lenses live up to that benchmark, they have to first be put through a series of tests before, during and after assembly.

### ASSEMBLED BY HAND

Every Fujinon lens is assembled almost

entirely by hand, with every element manually inspected and cleaned before assembly.

Fujifilm's newest lens is its Fujinon XF 100-400mm F4.5-5.6 R LM OIS WR lens, and the company walked us through its entire production process.

Once all of the 100-400mm's elements are mounted and assembled, each lens goes through an automated SFR (Spatial


**"Fuji Photo Optical Company (Ltd) was founded in 1944 and built lenses for several companies, including Leica."**



The quality of the Fujinon lenses is what allows Fujifilm's X-Trans sensors to achieve their full potential.







Frequency Response) adjustment process, where the lens is evaluated for the sharpness it can capture and adjusted to meet Fuji's standards. After SFR adjustments, the lenses are sent to another machine that applies UV bonding to fix all the components together.

Next, the assembled lenses are sent for testing to ensure that all the drive mechanisms, including zooming, work properly. Fujifilm also tests focus speed and focus slip at this point, thus ensuring that the lens get to the point of focus fast, and also stops at exactly that point. This means less focus hunting, and speedier lens performance.

### **MAKING A PERFECT LENS**

Other than ensuring that every single lens operates perfectly, tests are also done to ensure that the image quality meets Fujifilm's high standards. Vignetting



A Fujifilm employee holds a special, not for sale, Fujinon lens with the words "5th anniversary" engraved.







The final packing is done by hand, after all the checks are complete, and weighed to make sure the correct product is inside.

Vignetting tests, which evaluate the vignetting present in the image, as well as the performance of vibration control on the lens, are carried out by having the lenses mounted on a camera body and set to capture images of Fujifilm's unique test charts.

Special equipment is used to test the AF and aperture control of each lens, as well as resolution level. All tests are done to CIPA standards using a resolution chart, so the benchmarks are industry standard.

After all that is done, the final step is to send the lens for automatic evaluation, in which an automated evaluation device takes the lens through a series of sensory tests, including zoom operation and angle adjustment, to ensure optimal calibration for each and every lens.

### MADE IN JAPAN

When that's all done, each completed lens is sent to packing stations, where they're registered in Fujifilm's lens database with a unique SKU number. The lenses are then

engraved with a unique serial number (that's also captured in the system) as well as the words, "Made in Japan," before being sent for packing.

How does Fujifilm ensure that every box is packed correctly? Each and every package is weighed to an acceptance of +/- 5 grams, to ensure that the right contents have been inserted. Before shipping, every lens gets an appearance check, sensory test, and zoom operation check, so you can be sure the copy that reaches your hands is truly the best copy you can get.

We were told that every XF100-400 lens goes through a total of seven checks before completion. It takes about 220 minutes to complete each lens (by way of comparison, the less complex XF 35mm F2 R WR takes 80 minutes per copy). Because of all the checks taken throughout the process, only about 150 units of the XF100-400 are completed each day by the factory. Knowing the painstaking effort that is put into the construction of each and every lens, we're firmly convinced that they deserve the "Made in Japan" label. **HMM**

**"Every lens gets an appearance check, sensory test, and zoom operation check, so you can be sure the copy that reaches your hands is truly the best copy you can get."**



Fujifilm's newest lens, the XF100-400mm F4.5-5.6 R LM OIS WR, thoroughly deserves its "Made in Japan" label.

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LEARN

# YOUR ULTIMATE GUIDE TO NETFLIX

Couch potatoes rejoice, Netflix is finally here in Singapore! That means no more relying on proxy services and VPNs to watch Netflix any longer. To help you get on your way, here's a comprehensive guide on how to start watching Netflix, as well as some tips and tricks to maximize your Netflix experience.

Text by *Kenny Yeo*

## MORE INSIDE >

- NETFLIX LIFE-HACKS
- NETFLIX ADD-ONS



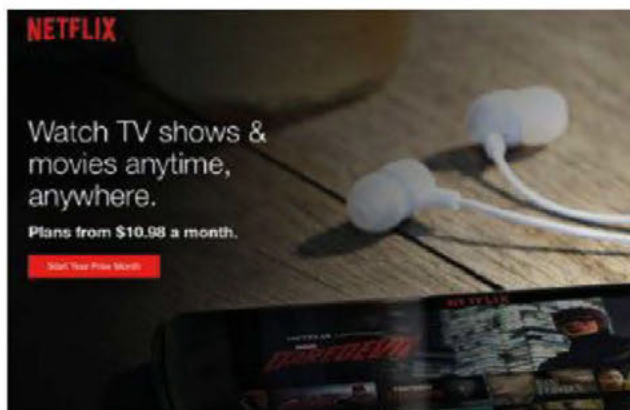
# EVERYTHING YOU NEED TO KNOW TO GET STARTED ON NETFLIX

Intrigued, but not sure if Netflix is for you? Check out our guide to help you get started.

At CES 2016, Netflix made a major announcement that it would be launching in 130 new countries. Singapore was one of these countries. Now that it's here, some of you might be wondering, what is Netflix exactly? Can I only watch it on my TV? And how does it compare to Netflix USA? Let us answer all questions and help you get started.

## NETFLIX 101

Netflix is a video on demand streaming service. Now, some users might wonder how it differs from Singtel TV and Starhub TV. The main difference is that Netflix viewers can choose to watch whatever is on the Netflix catalog whenever they want. In their defense, both local broadcasters, Singtel TV and StarHub TV do have on demand videos, but that only makes up a small portion of their catalog, unlike Netflix which purely offers video on demand.



## WATCHING NETFLIX

The other great thing about Netflix is that you can watch it on a multitude of devices. You can watch Netflix on your TV, computer and just about any mobile device.

You can watch directly on your web browser simply by heading to Netflix's website and logging into your account. Or you could download the Netflix app for your Android, iOS or Windows Phone smartphone or tablet and watch it on those devices too.

And if you want to watch Netflix on your television, there's a couple of ways. The Netflix app is available for most smart TVs from major brands like Samsung, LG, Philips, Sharp and Sony, and that would be the most straightforward way. Alternatively, if you have a modern internet-enabled gaming console like a PlayStation 4 or Xbox One, you could download the Netflix app for those consoles

and watch Netflix on your TV using your game console. However, if these methods don't work for you, you could invest in a Google Chromecast, which is an affordable and super tiny HDMI streaming dongle; or an AppleTV, which is a digital media player and streaming device.

Also, for existing subscribers of Singtel TV and StarHub TV, there are plans to bring Netflix to your respective set-top boxes from April, allowing you can use your existing set-top box to watch Netflix.

Another nifty thing is that viewing progress is carried over across devices, which means customers can begin watching on their phones while commuting, pause it when they get home, and then resume watching on their TV without missing a beat.



### Watch on your TV

Smart TV's, PlayStation, Xbox, Chromecast, Apple TV, Blu-ray players and more.



### On the go

iPhone, iPad, Android phones and tablets, Windows phones and tablets.



### Use any computer

Watch right on Netflix.com.

## THE PLANS

Netflix offers three subscription plans: Basic, Standard and Premium. And the important thing to know is that the plan does not determine access to content, meaning to say that there's no need to worry that a cheaper plan might not be able to watch some shows that only those with premium plans can.

One of the key differences between the plans is the resolution you can watch at and also the number of devices that can log on simultaneously. With a Basic subscription, which costs \$10.98 a month, you will only be able to watch videos at 480p. That's not ideal given that anyone who has bought a new TV in the past three or so years is likely to have a Full-HD TV. Likewise, if your notebook and mobile device is relatively new, it is likely to have a display that supports Full-HD resolution and beyond too. Plus, with a Basic subscription, you can only watch Netflix on a single device at any one time.

A Standard subscription is recommended for most users as it will give you access to videos in Full-HD (1080p) resolution. Furthermore, it will let you watch on two devices simultaneously, which is great for couples or families who want to watch different shows. The Standard plan is only slightly pricier at \$13.98 each month.

For cinephiles, the Premium plan is for you as it allows you to watch shows up to Ultra HD or 4K. It also lets you watch Netflix on up to four devices simultaneously, which is great for large families. One thing to note, however, is that not all shows are available in Ultra HD,

though most of the newer and more popular titles are. Of course, it goes without saying that you need a 4K display to be able to take full advantage of the 4K content as well. The Premium plan is the most costly at \$16.98 a month.

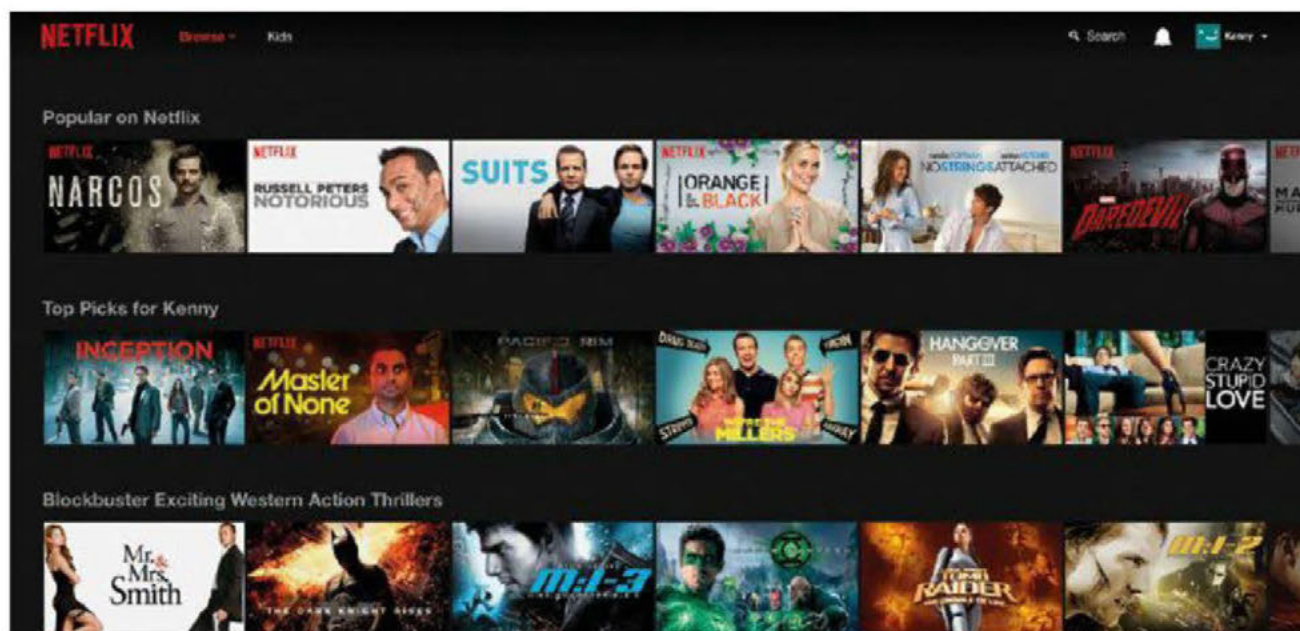
Choose the plan that's right for you

Downgrade or upgrade at any time

	Basic	Standard	Premium
Price after free month ends on 1/3/16	\$10.98	\$13.98	\$16.98
HD available	✗	✓	✓
Ultra HD	✗	✗	✓
Screens you can watch on at the same time	1	2	4
Watch on your laptop, TV, phone and tablet	✓	✓	✓
Unlimited movies and TV shows	✓	✓	✓
Cancel anytime	✓	✓	✓
First month free	✓	✓	✓

Ultra HD only available on the 4 screen - HD plan. High Definition (HD) and Ultra High Definition (Ultra HD) availability subject to your internet service and device capabilities. Some content available in HD or Ultra HD. See [Netflix of color](#) to view details.

Continue



## NETFLIX SINGAPORE OR NETFLIX USA?

Now, some of you might have read that Netflix Singapore still pales in comparison to Netflix USA when it comes to content, and that's true. Because of licensing issues, shows like House of Cards are not available on Netflix Singapore. In fact, a comparison done showed that we only have access to about 10% of the shows and movies that Netflix USA has.

Subscribing to Netflix USA isn't as hard as you may think either. All you need is a VPN or proxy service provider and that can be set up in as little as 15 minutes. However, there are some issues that you should consider before going down this route. To begin, subscribing to Netflix USA will be costlier in the long run because you need to subscribe to a VPN or proxy service too.

But perhaps more importantly, Netflix has said that it wants to clamp down on users bypassing geographical restrictions to access its content. In the past few weeks, there have been reports of some users in Singapore losing access to Netflix USA as Netflix

clamps down on VPN and proxy services looking to circumvent the geographical content restrictions that the company has put in place. This occurrence is not exclusive to Singapore viewers, Netflix USA viewers in Australia also reported experiencing the same fate.

Fortunately for most of these viewers, they were able to resume watching Netflix USA once their respective VPN service providers found workarounds. Peter Dujan, managing director uFlix, a firm that specializes in provided Netflix USA to Australian users, said, "It's simply a game of cat and mouse, and this is our job, so let's play."

What this really means for new users contemplating between Netflix Singapore and Netflix USA is this: Netflix Singapore is easily the more fuss-free option, but it comes at the cost of a limited catalog; on the other hand, Netflix USA provides more entertainment options, but it costs more and could be problematic at times (especially if Netflix USA clamps down on your VPN or proxy service provider).



# ENHANCE YOUR NETFLIX EXPERIENCE WITH TWO SIMPLE ADD-ONS

Alternatively, how to get the most out of Netflix beyond Netflix's default settings.

by Liu Hongzuo

If you're already using Netflix for a handful of shows, this enhancement guide is for you. There's a fair bit of good stuff that Netflix has and doesn't offer upfront, but that can be easily fixed when you have access to these add-ons. No, we aren't bypassing any licensing laws to get you to a show you want. We're showing you how to get access to good shows on your current catalog.

Some of these add-ons require slight tinkering on your end, so exercise discretion and healthy web-surfing habits if you want to get them to work smoothly.

## NETFLIX SUPER BROWSE

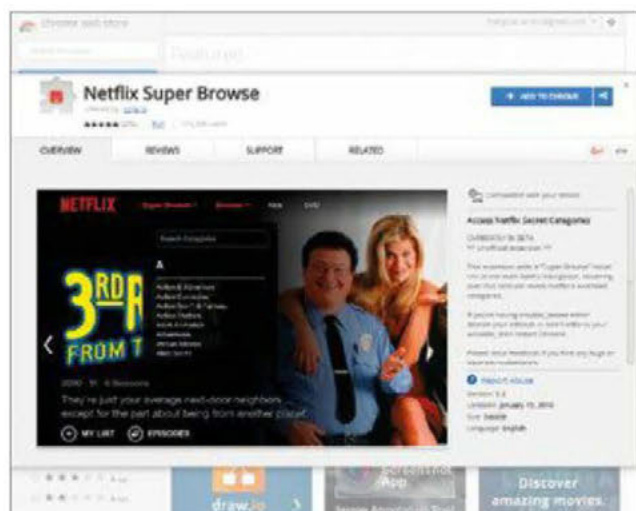
If you're a seasoned Netflix user, you've most likely read or heard about how Netflix actually has secret genres or categories for their shows. As a viewer, we have our own tastes, so it's better (for us) to know what shows are available in a specific category that caters to our liking. Netflix Super Browse is an extension for Chrome and Firefox web browsers, and it 'unlocks' said hidden categories.

Installation is simple: if you're on Chrome, simply go to the Chrome extension store and search for the add-on. Click on the "Add To Chrome" button when you find the extension. Restart your browser when done.

Go back to your Netflix and you'll notice that your original Browse button is now next to a brand new Super Browse option. Tucked within is a list of genres handpicked by the extension maker, covering important subsections without cluttering the option with the entire list of hidden categories.

If the extension isn't working for you, try reinstalling it. Some ad-blockers are also not compatible with Netflix Super Browse, so switch ad-blocker extensions if you really want this add-on.

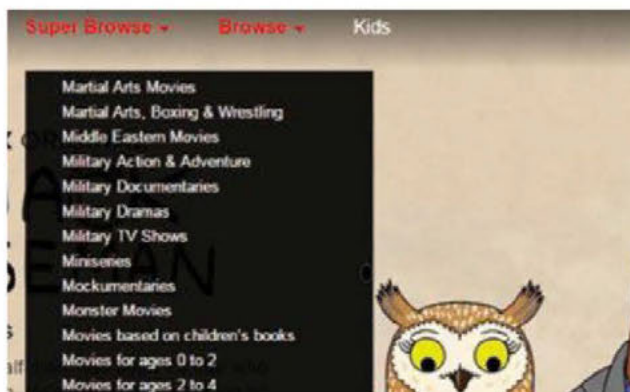
If you do not want to install any extensions, simply use a website equivalent to do the same search. One good example would be [netflixcodes.me](http://netflixcodes.me), where you can click on the genre code on the right-sided column, bringing you to that Netflix genre on a new tab. The website lists all genres (with some repeats), providing the full list at a glance.



The Netflix Super Browse extension.



This is how your Browse normally looks like...



... and this is the new Super Browse you'll get after installing.

Netflix Secret Categories	
What are we watching tonight? Search below. Click on the Search Code to Browse.	
	<input type="text"/>
	<input type="button" value="Surprise Me"/>
	<input type="button" value="Search"/>
Category	Search Code
Action & Adventure	1305
Action Comedies	43045
Action Sci-Fi & Fantasy	1506
Action Thrillers	43046
Adult Animation	11001
Adventure	7442
African Movies	3191
Alien Sci-Fi	3327

Website alternative to this extension, found at <http://netflixcodes.me>.

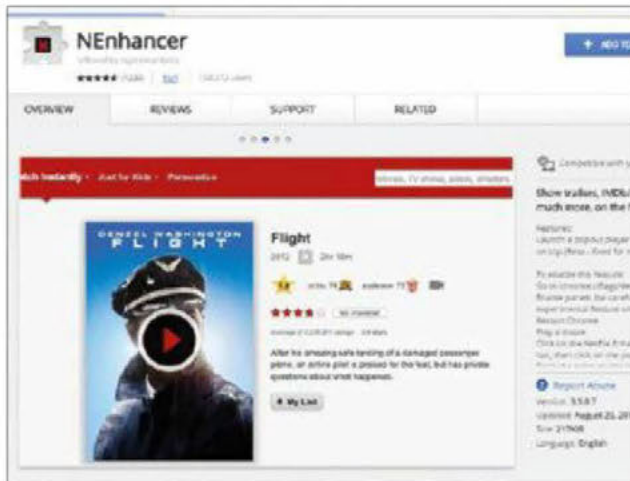
## NENHANCER

Now that your shows are properly categorized for easier exploration, you'll probably want to know which ones are worth your time. Wouldn't it be nice to have a little something within the Netflix page that can display ratings from various film review websites?

NEnhancer is a Chrome extension that lets you tweak your Netflix page to include ratings from review aggregation sites IMDB and Rotten Tomatoes.

Like all extensions, download and install on the Chrome extension page like before. Go to your Netflix main page, and you'll see a NEnhancer logo inside your browser's address bar. Click on it and click Options, and you'll be shown the same list of settings found in the extension management tab for Chrome. By default, some features are already enabled, but we want to full package here. So go ahead and check both "IMDB Panel" and "RT Panel". This will bring up a prompt in red, asking you enable an experimental Chrome feature.

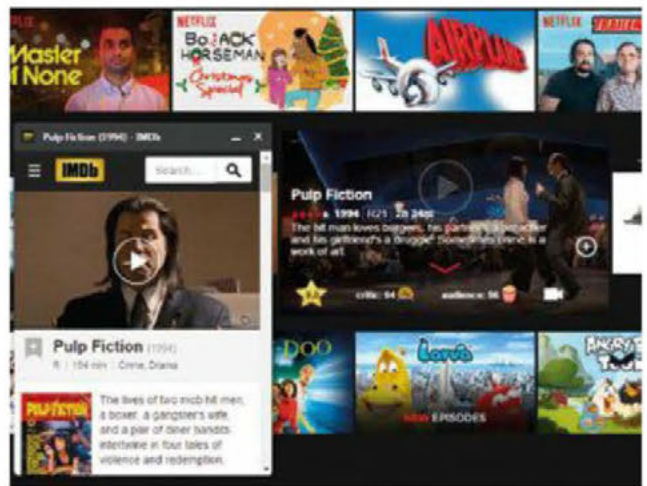
Follow those instructions to enable the experimental feature, and close your entire browser properly. Now you can re-open Chrome browser, go back to the Netflix website, and start hovering your mouse over some titles.



The NEnhancer extension.



Pull up this menu by clicking the NEnhancer logo in the address bar, or in the extension's settings.

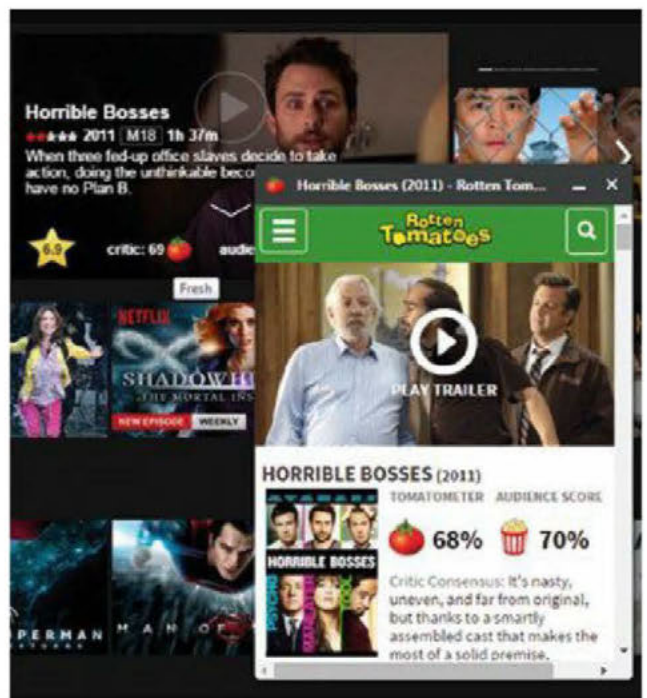


Pulling up show ratings from film critic sites is much easier with add-ons.

The star rating you now get is actually from film database site IMDB. The tomato and the popcorn icons are from Rotten Tomatoes. If you've configured your NEnhancer extension with the instructions above, you'd also have the ability to launch a tiny pop-up. This shows you more information from the respective ratings site, making it a great way to explore the reviews written for the show.

You can also access the trailer by clicking the icon next to the star, making it super handy and quick for you to decide whether the show is worth watching (based on the trailer and the recommendation).

With both enhancements, you now have all the necessary tools for a better Netflix experience without leaving the Netflix site itself. Knock yourselves out.



When you're done, you should have all the ratings at your fingertips.



# 7 NETFLIX HACKS, TIPS, AND TRICKS YOU NEED TO KNOW

Here's how to get more from your Netflix subscription.

by James Lu

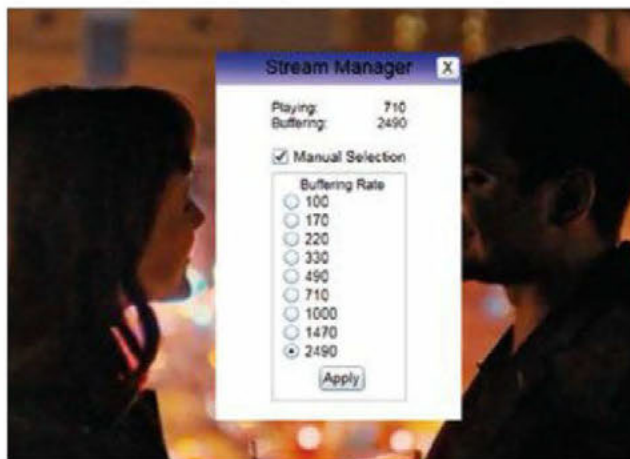
Are you getting the most out of your Netflix subscription? Here are seven Netflix hacks, tips, and tricks that will dramatically improve your binge-watching experience!

## 1. ACCESS A HIDDEN MENU TO KILL BUFFERING

If you find yourself infuriated by constant buffering, try this hack. If you're on a PC, press **Shift + Alt + Left Mouse Click**, and if you're using a Mac, press **Shift + Option + Click**. This will open Netflix's diagnostic menu.

From here, select the Stream Manager. This is the only place where you can manually adjust the buffering rate. By increasing the buffer rate, you can force Netflix to download much more video to your computer prior to showing the video.

You will have smoother, high quality video, and less pauses in-between for buffering, but you will have a longer wait before the video starts to play. By decreasing the buffer rate, you risk choppy, lower quality video - the video, however, will play much quicker.



## 2. KEYBOARD SHORTCUTS

Everybody knows about hitting the Spacebar to pause, but do you know all of the keyboard shortcuts available on Netflix?

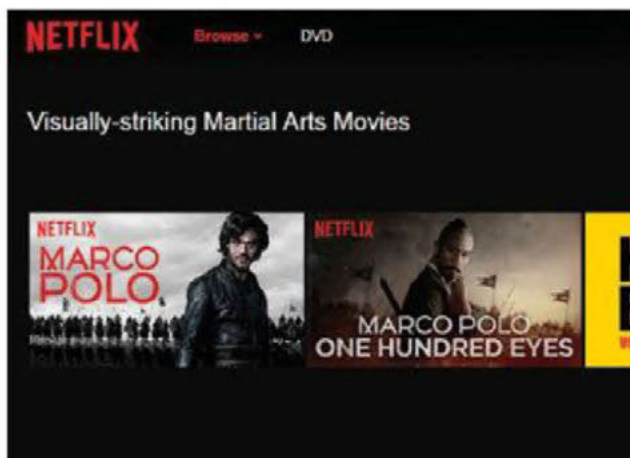
- On top of **Spacebar**, you can also hit the **Enter** key to pause/play.
- You can also use **PgDn** to pause, and **PgUp** to resume play.
- **F** will take you to full screen; **Esc** will take you out of it.
- **Shift+Left Arrow** will rewind, while **Shift+Right Arrow** will fast forward.
- You can use the **Up** and **Down Arrows** to adjust the volume.
- **M** will mute audio on and off.



## 3. SEARCH USING NETFLIX'S SECRET CATEGORIES

Sure, you can browse Netflix using the usual Action, Drama, Comedy categories, but what if your tastes are a little more esoteric? Netflix has a master list of thousands of subgenres, most of which don't show up in the regular browsing categories. Instead, you'll have to input a category code for your specific vice. First, put this into your address bar: <http://www.netflix.com/browse/genre/###>

Then replace ### with the code of the category you're looking for. For example, 7687 is Film Noir, and 3196 is Visually-striking Martial Arts Movies. You can check out the entire list of category codes at <http://netflixcodes.me/>



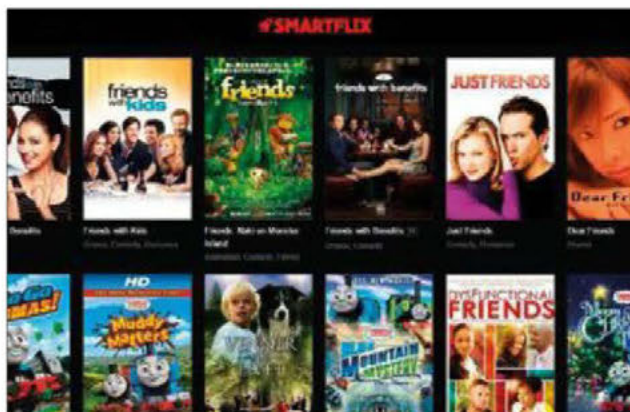
PICTURES NETFLIX



#### 4. ACCESS THE FULL CATALOG OF NETFLIX SHOWS AND MOVIES FROM ANYWHERE IN THE WORLD

Singaporeans who have been using Netflix via VPN will already know how to configure their VPN settings to access a specific country's Netflix settings, but for a more convenient fix, just use Smartflix. It shows every movie and TV show from Netflix's entire catalog worldwide in one simple interface, and it's as simple as clicking on what you want to watch.

Right now the service is in beta, and is currently free to use. Once it's out of beta, there will be a one month trial period (no sign up or credit card required), then if you want to keep using it, it's just a one-time payment of US\$7.99.



#### 5. SET UP MULTIPLE USER ACCOUNTS FOR DIFFERENT MOODS

Netflix lets you set up a maximum of five different logins on your account; most people use this to let other family members share the same Netflix account. But even if you're not using all of your login slots, those extra user accounts can still come in handy.

Set up one account for 'Serious', when you're in the mood for political thrillers and tearjerker dramas, and one account for 'Silly', when you're in the mood for Harold and Kumar or anything starring Seth Rogen. That way your viewing history will be separated, which will make viewing recommendations more accurate.

Or try setting up one account for yourself, one for your significant other, and a shared account for joint viewing, that way those period dramas you only watch together won't interfere with your individual taste for Nazi Dinosaur-fighting spy comedies.

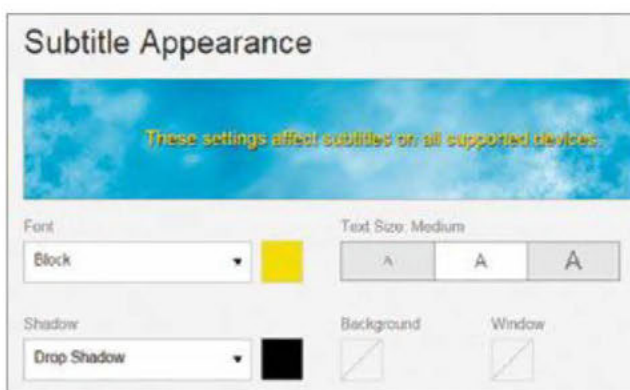


#### 6. CUSTOMIZE THE SUBTITLES

If you've ever had to stop watching a foreign language movie thanks to illegible subtitles - hello white subtitles in a movie about Alaska - Netflix has the answer. Just go into Your Account and select Subtitle Appearance under the My Profile section.

Now you can change everything to do with the font, including picking from seven fonts and three font sizes. You can even choose from five types of letter shading, as well as altering the color of the text and the text outline.

You can even choose whether the subtitles have a background, or sit in a window. You'll get a handy preview of any changes in a box at the top.



#### 7. RATE EVERYTHING FOR BETTER RECOMMENDATIONS

This last one may seem obvious, but it's worth mentioning because so many people don't bother doing it: Rate everything. No matter what you watch, loved it or hated it, after you're done, take a second to rate it with Netflix's five-star rating system.

We're all conditioned to just blow past any type of survey these days, but in this case, it's really worth it, as rating a show gives Netflix's algorithms more data to work with when it's recommending shows and movies for you. If you forgot to rate a show and you want to go back and do it, just navigate to the show's title page and click on how many stars you want to give it.



# PLEASE MR. POSTMAN

by Liu Hongzuo

Sending a parcel out is no longer be the same in this mobile age. You can get live-tracking via smartphone or setup customized instructions to your courier without ever meeting them. Here are four apps that are specially designed for your unique courier requirements – be it bulky items or even live animals.



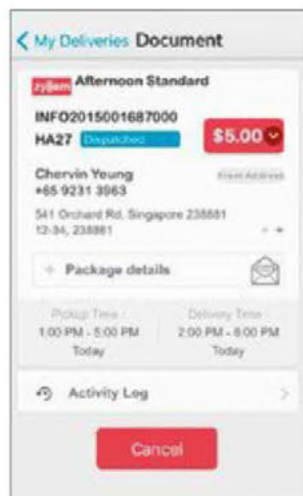
## ZYLLEM

iOS, Android  
Free



Previously known as RocketUncle, this is a conventional courier service distilled into

an app format. You can create new delivery requests in a few simple steps and manage your package delivery history at a glance. Like typical courier-delivery services, it picks up and delivers your parcels within the scheduled timeframe. Zyllem also provides real-time delivery tracking via SMS or email, and real-time confirmation of successful orders. This way, you can rest easy knowing where your parcel exactly is, without calling up the company to ask about your parcel's status.



Get the familiar courier delivery experience with the added bonus of real-time tracking, but via an app. Isn't the future wonderful?

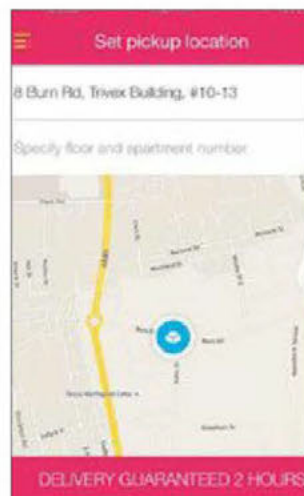
## ZAP DELIVERY

iOS, Android  
Free



This courier and delivery service app can give traditional courier companies a

run for their money. Instead of paying for costly express delivery services managed by internationally known courier firms, Zap Delivery promises to have your packages delivered within two hours, carried out by competent couriers. Prices are determined by package type and distance covered, similar to taxi rides. Given the layout of the interface and its price model, Zap Delivery works like Uber for parcels, and yes, you can become a courier yourself.



Zap Delivery's interface makes courier services look like Uber for parcels, and such a user-friendly design is always a huge plus to users.

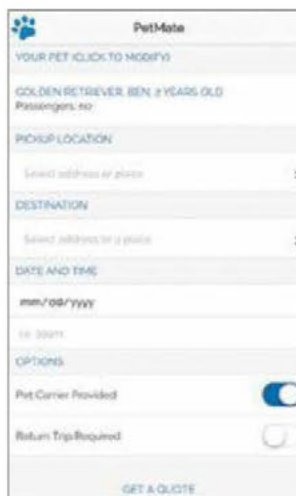
## PETMATE

iOS, Android  
Free



While it sounds like a pricey taxi service app for pets on paper, PetMate has the extra benefit of

letting the user arrange a ride for the pet in advance. You can even arrange for return trips by specifying the timeslot for your pet to return from their solo trip around town. Effectively, this becomes a courier service that securely delivers pets with minimal supervision required on your end – accompanying it is entirely optional here. Send your furkid to the groomers and have them back to you on time, or drop them off at a pet hotel while you make a beeline to the airport for that holiday.



As seen on the booking page, you can arrange a return trip in advance, while specifying the species and breed of your transported pet.

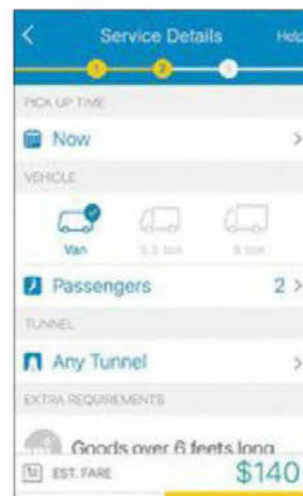
## GOGO VAN

iOS, Android  
Free



We have normal courier services, express alternatives, and even one version for pets. What

about a courier that delivers bulkier items, without the need for advanced bookings? Now, there's even an app for this niche. GoGoVan uses instant matching to get the closest van drivers for you, with the driver's personal information clearly displayed on the app. It also has 24/7 availability – that's one point in their favor when compared against traditional mover companies. You can also track your GoGoVan driver and rate them based on their performance too.



Want to move something bigger without having to wait a few days? Get a man with a van via an app that meets your requirements.

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The Nokia 7250, released in 2003, represented the fashion-conscious back then. The phone had a 4,096 color display and two games that weren't Snake. The 7250i could even support XHTML.



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